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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

VOL. XLVIII—No. 5

May, 1922

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OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS

(INSTITUTED 1852)

VOL. XLVIII—No. 5.

MAY, 1922

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1922

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TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF SOILS FOR FOUNDATIONS, ETC.: Robert A. Cummings, E. G. Haines, Allen Hazen, James C. Meem, Walter J. Douglas.

TO REPORT ON STRESSES IN RAILROAD TRACK: A. N. Talbot, A. S. Baldwin, G. H. Bremner, John Brunner, W. J. Burton, Charles S. Churchill. W. C. Cushing, W. M. Dawley, H. E. Hale, Robert W. Hunt, J. B. Jenkins, George W. Kittredge, Paul M. LaBach, C. G. E. Larsson, G. J. Ray, Albert F. Reichmann, H. R. Safford, Earl Stimson, F. E. Turneaure, J. E. Willoughby.

ON HIGHWAY ENGINEERING: H. Eltinge Breed, George W. Tillson, A. B. Fletcher, John M. Goodell.

ON BRIDGE DESIGN AND CONSTRUCTION: Henry B. Seaman, Howard C. Baird, Victor H. Cochrane, Otis E. Hovey, C. W. Hudson, M. S. Ketchum, B. R. Leffler, F. E. Turneaure.

ON CONTRACT STANDARD CLAUSES: H. Eltinge Breed, J. H. Brillhart, J. S. Langthorn, Edward H. Lee, Hunter McDonald, George H. Pegram, Henry H. Quimby.

ON INDUSTRIAL EDUCATION: Herman Schneider, E. J. Mehren, Leonard S. Smith.

ON RESEARCH: A. N. Talbot, F. E. Schmitt, Robert A. Cummings, W. C. Cushing, A. T. Goldbeck, D. C. Henny, R. E. Horton, Anson Marston, F. E. Turneaure.

ON ELECTRIFICATION OF STEAM RAILWAYS: Charles F. Loweth, B. J. Arnold, George Gibbs, George W. Kittredge, E. J. Pearson, Samuel Rea, Robert Ridgway.

The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

HEADQUARTERS OF THE SOCIETY—33 WEST THIRTY-NINTH STREET, NEW YORK.

TELEPHONE NUMBER.....7100 Longacre.
CABLE ADDRESS.....“Ceas, New York.”

Vol. XLVIII. MAY, 1922. No. 5.

AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852

PROCEEDINGS

This Society is not responsible for any statement made or opinion expressed in its publications.

SOCIETY AFFAIRS

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MINUTES OF MEETINGS

OF THE SOCIETY

May 3d, 1922.—The meeting was called to order at 8:10 P. M.; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, 62 members and guests.

The minutes of the meeting of April 5th, 1922, were approved as printed in *Proceedings* for April, 1922.

The following deaths were announced:

WILBUR FISK FOSTER, of Nashville, Tenn., elected Member, May 7th, 1873; died March 27th, 1922.

SYLVAN EARLE GANSER, of St. Paul, Minn., elected Associate Member, January 2d, 1912; Member, January 18th, 1921; died April 14th, 1922.

LAWRENCE BATES JENCKES, of Worcester, Mass., elected Junior, March 31st, 1891; Associate Member, October 7th, 1896; Member, September 6th, 1910; died March 29th, 1922.

CHARLES MILLER MORSE, of Mount Dora, Fla., elected Member, January 2d, 1895; date of death unknown.

HORACE EDWARD STEVENS, of St. Paul, Minn., elected Junior, November 1st, 1875; Member, April 4th, 1888; died February 15th, 1922.

FRANK EPHRAIM CHESLEY, of Goldsboro, N. C., elected Associate Member, December 31st, 1913; died January 9th, 1922.

GEORGE ROBERT DAVIS, of Sacramento, Calif., elected Associate Member, April 3d, 1907; died March 31st, 1922.

LOUIS WILLIAM KLINGNER, of Baghdad, Mesopotamia, elected Junior, October 31st, 1911; Associate Member, June 24th, 1914; died April 2d, 1922.

CLARENCE IVAN LANTZ, of Morgantown, W. Va., elected Associate Member, October 1st, 1913; died September 4th, 1921.

EMERET CLAUDE NEUDECKER, of Storm Lake, Iowa, elected Associate Member, April 19th, 1920; died June 8th, 1921.

President Freeman reported on the Spring Meeting of the Society held at Dayton, Ohio, on April 5th to 7th, 1922, inclusive. In this connection, a series of moving picture films and lantern slides of the works visited, etc., were shown for the benefit of the local members.

A paper entitled "The American Mixed-Flow Turbine and Its Setting", by Arthur T. Safford, M. Am. Soc. C. E., and Edward Pierce Hamilton, Esq., was presented by Mr. Safford. Written discussions by Messrs. W. M. White and Forrest Nagler were presented by the Acting Secretary, and the subject was discussed orally by Messrs. E. P. Hamilton, G. A. Orrok, and President Freeman.

Adjourned.

DAYTON, OHIO, MEETING

April 5th, 1922.—The Spring Meeting of the Society was called to order at 10 A. M., at the Engineers' Club, Dayton, Ohio; President Charles H. Paul of the Dayton Section in the chair; Elbert M. Chandler, Acting Secretary; and present, also, about 350 members and guests.

Chairman Paul introduced Col. E. A. Deeds, Chairman of the Board of Directors of the Miami Conservancy District and President of the Engineers' Club of Dayton, who presented an address of welcome.*

President John R. Freeman of the Society was then introduced by the Chairman and replied† to the welcome extended by Col. Deeds.

President Freeman took the chair.

A symposium on "Flood Problems"‡ was opened by J. G. Sullivan, M. Am. Soc. C. E., who addressed the meeting on "Flood Conditions in Canada." Mr. Sullivan was followed by Gerard H. Matthes, M. Am. Soc. C. E., whose subject was "Floods on Small Streams Caused by Rainfall of the Cloudburst Type". A paper on "Standing Waves in Rivers" was presented by Nathan C. Grover, M. Am. Soc. C. E.

Adjourned at 12 M., to meet again at 2:15 P. M.

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* See p. 392.

† See p. 393.

‡ See Papers and Discussions, p. 1091.

April 5th, 1922.—The meeting was called to order at 2:15 P. M.; President John R. Freeman in the chair; and present, also, about 350 members and guests.

In continuation of the symposium on "Flood Problems", President Freeman presented a paper on "Flood Problems in China", illustrating his remarks with lantern slides. President Freeman was followed by J. A. Ockerson, Past-President, Am. Soc. C. E., who discussed the subject, "Flood Control of the Mississippi River". A paper by Roy N. Towl, M. Am. Soc. C. E., on "Missouri River Bank Protection at Omaha, Nebraska", which was illustrated by moving pictures, was presented by the author.

After a recess and some announcements by Mr. Paul, a paper on "Flood Problems in the Arid Regions", was presented by A. P. Davis, Past-President, Am. Soc. C. E. Mr. Davis was followed by C. E. Grunsky, M. Am. Soc. C. E., who discussed "Some Factors Affecting the Problem of Flood Control", illustrating his remarks with lantern slides.

The addresses were followed by oral discussion of the general subject by Messrs. Morris Knowles, Harrison P. Eddy, C. E. Grunsky, and J. G. Sullivan.

Adjourned at 6:15 P. M., to meet again at 8:15 P. M.

April 5th, 1922.—The meeting was called to order at 8:15 P. M.; President John R. Freeman in the chair; and present, also, about 320 members and guests.

President Freeman introduced Arthur E. Morgan, M. Am. Soc. C. E., who addressed the meeting on "Factors in Engineering Accomplishment, the Miami Conservancy Project".* Mr. Morgan was followed by Charles H. Paul, M. Am. Soc. C. E., whose subject was "Flood Control in the Miami Valley, Ohio."†

The addresses were followed by oral discussion of the general subject by Messrs. J. Albert Holmes, who illustrated his remarks with lantern slides, D. W. Mead, Arthur O. Ridgway, and A. P. Davis.

Adjourned.

EXCURSIONS AND ENTERTAINMENTS, DAYTON, OHIO, MEETING

Monday, April 3d, 1922.—6:30 P. M.—The members of the Board of Direction of the Society and of the Dayton Section had dinner at the Engineers' Club of Dayton, with 38 members of the Dayton Section attending. The guests of honor included the former Governor of Ohio, the Hon. James M. Cox, Col. E. A. Deeds, Mr. Orville Wright, Maj. T. H. Bane, Commanding Officer of McCook Aviation Experimental Field, and Mr. Edward Wuichet, President of the Dayton Chamber of Commerce. Short addresses were made by Messrs. Freeman, Cox, Deeds, Bane, and Wuichet.

Tuesday, April 4th, 1922.—6:30 P. M.—The Board of Governors of the Engineers' Club of Dayton entertained the members of the Board of Direction at dinner at the Engineers' Club, in honor of the speaker at the regular Tuesday evening meeting of the Club, Mr. Paul Lincoln, who later gave a

* See p. 397.

† See Papers and Discussions, p. 1206.

talk in the Auditorium on "Some Important Factors in the Sale of Electric Service". President John R. Freeman also addressed the meeting, recounting some of his experiences while visiting with engineers in Europe.

Wednesday, April 5th, 1922.—The Chamber of Commerce of Dayton held a luncheon in the ballroom of the Miami Hotel, in honor of the members of the Society, at which about 500 members and guests were present, who listened to interesting talks by J. G. Sullivan, President, Engineering Institute of Canada, and President John R. Freeman. Just preceding the luncheon, the aviators at McCook Field staged a thrilling aerial circus over the river channel immediately in front of the Club.

Thursday, April 6th, 1922.—9:30 A. M.—About 250 members and guests spent an hour examining the Englewood Dam, arriving at 10:00 A. M. Enough water was passing through the conduits to show in a small way the action of the hydraulic pump at the outlet works.

On completing their inspection, the visitors were then taken to the City Club of the National Cash Register Company, where Dr. Charles Garland, the Welfare Director of the Company, gave an illustrated talk on the history of this great industry and its notable welfare work. He also gave a graphic account of the great Dayton Flood of 1913, and described the work of the Company for the flood sufferers. At 12:45 P. M., the party was conveyed to the plant of the National Cash Register Company, where a luncheon was served in the Officers' Club, on the 10th floor of the Administration Building. After luncheon, the party adjourned to the roof of the building, where a general view of the local flood-protection work along the Dayton Channel was obtained, and Mr. C. A. Bock, Division Engineer in charge of the Dayton Channel Improvements, gave a brief description of the character and volume of the work. After a trip through the plant, the visitors were taken to the Huffman Dam, on the Mad River, where an hour was spent in looking over this project. The outlet works at this dam are particularly interesting, as the conduits and spillway are combined. The conduits of this dam are much larger than those at the Englewood Dam where a much larger storage capacity enabled a more complete control of the flood flow. The party returned to Dayton at 4:45 P. M.

At 6:30 P. M., a dinner and smoker were held in the ballroom of the Miami Hotel, at which about 230 members and guests were present. Mr. Charles H. Paul, President of the Dayton Section, acted as Toastmaster, and introduced Mr. H. S. R. McCurdy, Chairman of the Local Committee of Arrangements, who introduced Col. E. A. Deeds, Chairman of the Board of Directors of the Miami Conservancy District. Col. Deeds gave an interesting talk on "Some Human Phases of the Miami Conservancy Projects." Edward E. Wall, Vice-President, Am. Soc. C. E., followed with a brief talk. Through the courtesy of the National Cash Register Company, a series of moving pictures of the various activities during the Spring Meeting were then shown.

Friday, April 7th, 1922.—9:30 A. M.—About 200 members and guests were taken by automobile for an inspection of the main features of the improved river channel through Dayton, which work is practically completed. The party was then taken to McCook Field, the Experimental Station of the U. S.

Air Service, where they were divided into small groups, to each of which was assigned an Officer as escort. An address of welcome was given by Maj. T. H. Bane, Commanding Officer of McCook Field. He was followed by 5-min. talks by the men in charge of experiments with the lighter alloys and aerial photography and mapping. The parties were then conducted through the woodworking shops, where the construction of wings and propellers was seen; the motor-testing laboratory, where various types of motors were under test; the wind tunnel building, where tests of the effect of wind pressure on models of buildings and a wireless tower were being conducted in the largest wind tunnel in the United States; past the propeller testing stand, capable of applying 1 000 h. p. to the test of propellers; and through the hangar where the wings of planes are tested with sand-bag loads applied to simulate actual stresses encountered in the air. The party then went to the Flying Field, where there was drawn up in review, one of every type of plane at the Field, from tiny pursuit planes weighing less than 300 lb. to heavy triplane bombers weighing 14 000 lb. Much interest was shown in a housed-in passenger plane, capable of carrying 2 pilots and 12 passengers. A wonderful flying exhibit was then given in which most of these planes were used. This trip was one of the most interesting features of the meeting.

The visitors were then taken by automobile to the Union Station in Dayton, where a special train was boarded for the trip to the plant of the American Rolling Mill Company, at Middleton, Ohio. After arrival at the plant at 1:30 P. M., luncheon was served in the Administration Building, and after a brief address of welcome by Mr. Hook, the General Manager, and a reply by C. E. Grunsky, Vice-President, Am. Soc. C. E., the party was conducted through the plant in charge of guides, who explained the various processes in the manufacture of Armco iron. The party left at 5:15 P. M., by special train, arriving at Dayton at 6:30 P. M.

OF THE BOARD OF DIRECTION

(Abstract)

April 3d, 1922.—The Board met at 10 A. M., at the Engineers' Club, Dayton, Ohio; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, Messrs. Anderson, Brown (came in at 10:25 A. M.), Chester, Curtis, Darrow, Davis, Dyer, Greene, Grunsky, Henny, Hogan, Holland, Huber, Hudson, Humphrey, Hunt, Marston, O'Connor, Pegram, Ridgway, Talbot, Wall, Webster, Winsor, and Yates.

On motion of Director Humphrey, seconded by Director Henny, and carried, the minutes of the meetings of the Board held January 16th and 17th, and January 18th and 20th, 1922, were approved.

Progress Report of Publication Committee

The Acting Secretary read the following progress report from the Publication Committee:

"In accordance with the instructions of the Board of Direction at its meeting of October 10th, 1921, the Publication Committee has made a partial sur-

vey of the situation in regard to advertising and reports progress to date as follows:

"Inquiry from the other three Founder Societies shows net returns from advertising of the following sums:

American Institute of Mining and Metallurgical Engineers	$7 800.00
American Society of Mechanical Engineers	71 000.00
American Institute of Electrical Engineers	28 557.98

"Inquiry from the American Institute of Mining and Metallurgical Engineers showed that the net proceeds from advertising before the war were approximately 50% of the gross, but that for 1922, according to present indications, the net profit would be only 30% of the gross receipts. Practically this same proportion is borne out by the Mechanical Engineers.

"Mr. Walter B. Snow, an advertising man of Boston, Mass., who has specialized in technical work, was asked for information and suggestions on this plan, and replied in substance as follows:

" 'The essentials which an independent publisher would consider necessary to success from the standpoint of business efficiency become obstacles in the eyes of the members in so far as they tend to disturb their conservatism and offend their dignity. The hazard is certainly great where diplomacy must play so large a part in working out a plan that is likely to give offense to so many. It appears that unless it is put over with a firm hand and traditions are somewhat ruthlessly broken down its progress will be slow and its success will be limited.'

" 'Under the conditions, I do not feel like making either a recommendation or a prophecy.'

"About two years ago, E. J. Rosencrans, M. Am. Soc. C. E., appeared before the Publication Committee and discussed the possibility of publishing the *Proceedings* of the Society free of expense to it, in exchange for the use of the *Proceedings* as an advertising medium. This was not entered into at the time for the reason that printing costs were increasing rapidly and were very uncertain. Mr. Rosencrans has been communicated with and asked if he cared to submit a proposal at the present time. He declined to do so.

"Mr. Edward G. Nellis, an expert in technical advertising, has been consulted at length, and on March 21st, 1922, submitted to the Acting Secretary an expression of his views on the subject. In brief, he urges the adoption of the plan followed by the Mechanical Engineers, of a journal of the standard journal size, 9 by 12-in. page in lieu of *Proceedings*, 6 by 9 in. However, he does express the opinion that a fair volume of advertising business could be obtained in *Proceedings* as at present conducted, at a rate which would be profitable to the Society. Furthermore, he has offered to furnish any additional details, or to make for us, a special study and analysis of the whole situation if it is desired that he undertake it.

"Mr. Humphrey, of the Committee, has offered to see what he can do in the way obtaining a few pages of advertisements for the 6 by 9-in. size."

Discussion on this report was participated in by President Freeman and Messrs. Brown, Chester, Curtis, Davis, Grunsky, Henny, Hogan, Hudson, Humphrey, Hunt, Marston, Ridgway, Talbot, Webster, and Winsor, arguments both for and against advertising being presented.

On motion of Past-President Curtis, seconded by Director Humphrey, and carried, the report was received.

The President inquired whether the Board cared to give any instructions to the Publication Committee, and there was some further discussion by Messrs. Anderson, Curtis, Hogan, and Humphrey.

The following motion was then offered by Vice-President Hunt, seconded by Director Humphrey, and carried unanimously:

"Moved, That the Publication Committee be requested to present to the Board at its next meeting a definite plan for soliciting and printing advertisements in *Proceedings,* setting forth the salient features in such a way that each may be separately acted on."

Report of Committee on Special Committees

Chairman Davis, of the Committee on Special Committees, reported verbally for his Committee as follows:

(1) In regard to the desirability of a Committee of the Society on Military Affairs (suggested by R. D. Coombs, M. Am. Soc. C. E., in a letter dated March 9th, 1921):

The Committee recommended no action at the present time.

(2) Suggested Joint Committee to Study the Housing Problem (this matter was referred by the Board at its January meeting to the Committee on Special Committees):

The Committee recommended that the Acting Secretary be instructed to correspond with the American Society of Mechanical Engineers and the American Institute of Architects with a view of some sort of co-operative action if it seems appropriate thereafter.

(3) Acceptance by the Society of responsibility for sponsorship and the organization of a representative Sectional Committee for the Unification of Existing and Proposed Specifications for Steel Railway Bridges (this matter was referred by the Board at its January meeting to the Committee on Special Committees):

Chairman Davis reported as follows:

"That this Society has a Committee on Specifications for Bridges, including not only railway bridges but highway bridges, and not only steel bridges but any other bridges that might be proposed. That Committee has not yet reported, except progress. For reasons, including a better representation of highway bridges as distinguished from railway bridges, the Committee on Special Committees thinks it is probable that it would be advisable to expand by increasing the membership of that Specifications Committee rather than to accept this sponsorship that has been proposed, and, therefore, recommends that the President of this Society be authorized to appoint not more than five additional members of the Committee on Bridge Specifications on the recommendation of the Committee on Special Committees.

"The thought is to secure the co-operation and assistance of the Committee of the American Association of State Highway Officials which has this matter under consideration and with which it is very desirable to secure uniform results; also to secure some co-operation with the Canadian Society which is now considering this subject so as to have an uniform specification as a final result."

(4) Question of adopting resolution *re* Pollution of Water by Industries (suggested by Charles Haydock, Assoc. M. Am. Soc. C. E., and referred by the Board at its January meeting to the Committee on Special Committees):

The Committee recommended the adoption of the following resolution:

"Resolved: That the United States Government be requested to undertake, through the Department of Commerce, a complete investigation of the cause, extent and effect of pollution of waters by industries, that methods of mitigating such evils be investigated, and that existing legislation be reviewed in order to determine what if any legislation is required to cope with the situation."

On motion of Vice-President Hunt, seconded by Director Humphrey, and carried, the recommendation of the Committee on Special Committees regarding the first subject in the report, that is, the desirability of a Committee of the Society on Military Affairs, was adopted.

Director Humphrey offered an amendment concerning the second subject that the words, "and such other organizations that may be directly interested in the housing question", be added, to which Past-President Davis agreed, and on motion of Vice-President Hunt, duly seconded and carried, the recommendation of the Committee on Special Committees as amended, regarding the suggested Joint Committee to Study the Housing Problem, was adopted.

After discussion concerning the third subject of the report, participated in by Messrs. Davis, Hudson, Humphrey, Marston, Talbot, Webster, and Yates, on motion of Director Marston, seconded by Past-President Davis, the following motions were carried unanimously:

"Reply is to be made to the American Engineering Standards Committee that the American Society of Civil Engineers will accept sponsorship at the proper time, but it is thought such time has not yet arrived."

"That the President be authorized to appoint not more than five additional members on the Special Committee on Bridge Design and Construction on the recommendation of the Committee on Special Committees."

On motion of Past-President Webster, seconded by Director Humphrey and carried, the recommendation of the Committee on Special Committees regarding the question of adopting a resolution *re* Pollution of Water by Industries was adopted.

Chairman Humphrey, of the Committee on Licensing Engineers, made a verbal progress report, and on motion of Director Henny, seconded by Vice-President Grunsky, and carried, the Committee was continued.

Code of Ethics and Committee on Professional Conduct

Chairman Winsor, of the Committee Considering a Proposed Universal Code of Ethics and the Appointment of a Committee on Professional Conduct, reported verbally for his Committee, outlining the history of the whole matter. Extended discussion was participated in by Messrs. Chester, Hudson, Humphrey, Hunt, Talbot, Webster, and Winsor.

The following revised motion offered by Director Winsor, seconded by Director Humphrey, was carried:

"Be it Resolved: That the Code be not approved."

On motion of Director Winsor, seconded by Director Humphrey and carried unanimously, the President was authorized to appoint a Standing Committee of Three on Professional Conduct, this Committee to be composed of members of the Board of Direction.

On motion of Director Humphrey, duly seconded and carried, Director Winsor's Committee on a Proposed Universal Code of Ethics was discharged with the thanks of the Board.

Chairman Brown, of the Committee to Consider the Whole Question of the Status of the Civil Engineer in Government Work and His Compensation, reported progress.

Chairman Humphrey, of the Committee to Report on Re-arrangement of the Fifteenth Floor, reported progress.

Chairman Wall, of the Committee to Prepare Policy for Collection of Funds for Bust of Captain Eads, reported progress ($1 337.26 is the amount of subscriptions received to date).

STUDENT CHAPTERS

Chairman Marston, of the Committee on Student Chapters, presented the following report:

"DAYTON, OHIO, APRIL 3, 1922.

"BOARD OF DIRECTION,

"American Society of Civil Engineers.

"GENTLEMEN.—The Committee on Student Chapters would report as follows on the matters which have been referred to us:

"1.—Criterion for 'High Standing' of Engineering Schools:

"Article V, By-Laws of the American Society of Civil Engineers, provides that one of the qualifications required of a proposed Student Chapter shall be:

"'(*a*).—An organization of students in an engineering school of high standing.'

"The question is what shall be the criterion for 'high standing'. We recommend that the criterion shall be:

"(*a*) Entrance requirements substantially equal to four years of work in an accredited high school. (15 units).

"(*b*) The maintenance of a well organized Department of Civil Engineering in charge of a Professor of Civil Engineering of high standing.

"(*c*) A Civil Engineering Faculty of high standing and satisfactory in numbers as compared with student attendance.

"(*d*) A Civil Engineering Department equipment adequate and satisfactory as compared with student attendance.

"(*e*) At least four years of high grade undergraduate college work, or its equivalent, as prerequisite to a degree.

"(*f*) A regular Civil Engineering Student attendance of at least 12 Juniors and Seniors, in order to insure the permanent maintenance of a strong Student Chapter.

"2.—Admission of Student Chapters:

"(*a*) We recommend the immediate admission of the Student Chapters applied for at:

"Clemson Agricultural and Mechanical College of South Carolina; The Georgia School of Technology; Norwich University; The University of Virginia; Worcester Polytechnic Institute. All, however, on condition the applications shall be found by the Acting Secretary to be in proper form and to comply with the requirements of Article V, By-Laws.

"Respectfully submitted,

"C. W. HUDSON,
"A. N. TALBOT,
"ANSON MARSTON."

On motion of Director Brown, duly seconded and carried, this report was adopted and the Committee continued.

Chairman Brown, of the Public Relations Committee, reported progress. He reported that the majority of his Committee was in favor of joining the Federation.

Replies from Local Sections *re* Joining the Federated American Engineering Societies

Verbal reports were made by the Directors, as to action taken by the various Local Sections in their Districts on the question of the Society joining the Federated American Engineering Societies, as follows:

District:	Report from Director:	Local Section:	Sentiment:
No. 1	Hogan	New York	Opposed
No. 2	Winsor	Northeastern	Not heard from
		Connecticut	Opposed
		Providence	Opposed
No. 3	O'Connor	Buffalo	Opposed
No. 4	Humphrey	Philadelphia	Not heard from
		Baltimore	" " "
No. 5		Dist. of Columbia	In favor
		Atlanta	Not heard from
No. 6	Chester	Pittsburgh	In favor
		Central Ohio	In favor
		Cincinnati	Opposed
		Cleveland	In favor*
		Toledo	Not heard from
		Dayton	" " "
No. 7	Marston	Iowa	In favor
		Northwestern	Not heard from
		Detroit	In favor
		Duluth	In favor†
No. 8	Dyer	Nashville	In favor
		Illinois	Think no commitment should be made without taking letter-ballot
No. 9	Brown	St. Louis	In favor
		Kansas City, Mo.	Opposed
		Louisiana	In favor
No. 10	Darrow	Nebraska	Not heard from
		Colorado	" " "
		Kansas	" " "
		Utah	" " "
		Oklahoma	" " "
No. 11	Anderson	Los Angeles	In favor
		San Diego	" "
		Texas	" "
No. 12	Henny	Portland, Ore.	Opposed
		Seattle	Not heard from
		Spokane	" " " ‡
No. 13	Huber	San Francisco	Opposed.

Director Humphrey moved and Director Dyer seconded the motion, that the matter go over until the next meeting of the Board.

Director Brown suggested that the Acting Secretary call the attention of the Secretaries of the Local Sections to the rule requiring that Local Sections

* As soon as finances permit.

† Resolution suggests letter-ballot.

‡ The Acting Secretary reminded the Board that the Spokane Section had previously forwarded telegram in favor.

give the number of Corporate Members present when a vote is taken, and the name of the presiding officer.

Director Hogan offered as an amendment, that the matter be laid on the table. This was seconded by Director Hudson and lost by vote resulting in 11 ayes and 14 noes.

After further discussion participated in by Messrs. Anderson, Curtis, Grunsky, Henny, Hogan, Holland, Hudson, Humphrey, Marston, Ridgway, and Talbot, Director Humphrey's motion was carried with the understanding that reports would again be asked for, from the Sections not yet heard from.

Director Humphrey made a verbal progress report as the representative on the Joint Committee on New Pay Employment Bureau.

Visits of Acting Secretary to Local Sections

The Acting Secretary reported that during the week of February 20th, 1922, in accordance with authority of the Executive Committee, he had visited the following Local Sections: Dayton, Cleveland, Cincinnati, Central Ohio, Toledo, and Pittsburgh.

Proposed Amendments to By-Laws Regarding Student Chapters

It was reported that written notice had been given at the Board meeting of January 16th, 1922, of the Proposed Amendment to the By-Laws concerning the rule regarding the name of Student Chapters, and a copy had been mailed to each Director so that the matter now came up for final action.

On motion of Past-President Talbot, seconded by Director Marston and carried unanimously, the footnote applying to Section 1 of Article V of the By-laws was ordered amended by adding the following:

"Chapters which desire to retain local names well established by tradition may do so by inserting such local names followed immediately by the name of the institution in parentheses; for example, 'William Cain (University of North Carolina)."

making the footnote read:

"Insert the name of the educational institution at which the particular Student Chapter is situated, for example, 'Yale University'. Chapters which desire to retain local names well established by tradition may do so by inserting such local names followed immediately by the name of the institution in parentheses; for example, 'William Cain (University of North Carolina)'."

It was reported that written notice had been given at the Board meeting of January 16th, 1922, of the proposed amendment to the By-laws regarding changing the time of payment of dues of Student Chapters, and a copy had been mailed each Director, so that the matter now came up for final action.

On motion of Director Marston, seconded by Past-President Talbot, and carried, Section 6 of Article V of the By-laws was amended by striking out the last paragraph and inserting the following in lieu thereof:

"The annual dues shall apply to the year beginning July 1, and shall be due October 1 of such year. Student Chapters admitted on or after January 1 of each year shall pay only $5.00 for the remainder of the current year to July 1."

On motion of Director Marston, seconded by Director Henny and carried, it was decided that each Chapter which has paid its dues for 1922, shall be required to pay only $5 on October 1st, 1922.

Professional Divisions

The Acting Secretary reported that the Publication Committee has recommended that a By-law be prepared to make provision for the orderly formation of Professional Divisions within the Society, and the following was suggested:

"Article VII—Professional Divisions

"(1) A Professional Division of the American Society of Civil Engineers may, with the approval of the Board of Direction, be organized for the consideration of any engineering, scientific, or professional subject, provided that a number, satisfactory to the Board of Direction, of members of the Society unite in making written request for such an organization. Such a Division shall be designated as ..... Division of the American Society of Civil Engineers, the blank being filled by the subject specialized.

"(2) Members of the Society of any grade may be members of the Division upon enrollment without additional dues.

"(3) For the convenient conduct of its professional affairs, the President shall appoint annually, an Executive Committee of five members to have charge of the affairs of the Division under the guidance of the Board. Other committees of the Division shall be appointed by its Executive Committee.

"(4) Expenditures for the purpose of the Division chargeable to the Society must be authorized by the Board of Direction before they are incurred, and must be provided for in the Budget approved by the Board. No liability otherwise incurred shall be binding on the Society.

"(5) The Board of Direction of the Society may, at 60 days' notice, suspend or disband any Division."

The President explained this proposed By-law and Messrs. Henny, Hogan, Humphrey, and Talbot also spoke, and the matter was left with the understanding that this is to be regarded as the requisite written notice to the Board and that it will come up for final action at the June meeting of the Board.

Proposed Amendments to the By-Laws Regarding Membership

It was reported that A. Travers-Ewell, M. Am. Soc. C. E., in a letter dated March 21st, 1922, suggested that the fourth paragraph of Section 1, of Article I of the By-laws, be changed to read:

"Applications of engineers not resident in Continental United States, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission."

Discussion ensued, participated in by Messrs. Davis, Grunsky, Henny, Hogan, Hudson, Humphrey, Marston, and Ridgway.

Director Grunsky stated he would give this as the requisite written notice to the Board of this proposed amendment to the By-laws, and the matter will come up for final action at the June meeting of the Board.

Proposed Amendments to By-Laws Relative to Special Committees

At the meeting of the Board held January 17th, 1922, the Acting Secretary brought up the matter of rules for Special Committees, explaining that the rules as printed in the Year Book in one place provide that "all bills submitted by a Special Committee must bear the approval of its Chairman and Secretary" and, subsequently, under the heading "Expenses" it is provided that: "Extraordinary expenses, such as purchase of instruments, salaries of special employees and traveling expenses, must be specifically authorized and approved by the Chairman of the committee concerned."

The Board decided to simplify this procedure by ruling that all bills should be approved by the Chairman.

It was now reported that as the rules governing Special Committees have been written into the new By-laws from the information in the old Year Book, as given, it would be necessary to change the By-laws to have this take effect.

On motion of Director Humphrey, seconded by Director Hogan and carried, it was decided to regard this as the requisite written notice of the proposed amendment of the paragraph entitled "Funds" of Section 7 of Article IV of the By-Laws, by omitting the words "and Secretary". The matter will come up for final action at the June meeting of the Board.

Suggested Change in Constitution *re* Compounding of Dues

At the meeting of the Board held January 17th, 1922, a letter from L. D. Rights, M. Am. Soc. C. E., dated January 13th, 1922, suggesting a change in the Constitution *re* the compounding of dues was referred to the Executive Committee. The Executive Committee favorably considered the suggestion and instructed the Acting Secretary to formulate a statement for consideration.

As a result, Vice-President Grunsky offered the following suggested amendment to Section 5 of Article IV of the Constitution:

"All future annual dues may be compounded by Corporate Members or Affiliates after having paid dues for five years, in accordance with the schedule presented in the following table:

Elapsed membership, in years.	Corporate Members.		Affiliates.	
	Resident in Dist. No. 1.	Not Resident in Dist. No. 1.	Resident in Dist. No. 1.	Not Resident in Dist. No. 1.
5 to 10	$400	$300	$250	$200
10 to 15	325	250	200	160
15 to 20	250	200	150	120
20 to 25	150	125	100	80
25 to 30	60	50	40	35

"After having paid dues for 30 years, every Corporate Member or Affiliate upon attaining the age of 70 years shall be exempt from the payment of further dues.

"Any Corporate Member or Affiliate having compounded his dues while resident elsewhere than in District No. 1, if he change his residence to District No. 1 shall annually pay the excess of the dues in District No. 1 over those elsewhere, but may compound this annual payment by a lump-sum payment equal to the difference between the figures in the foregoing table, as determined for his years of membership.

"If an Affiliate who has compounded his dues is transferred to Corporate Membership, he shall have the same option of either paying annually, the difference in dues or making a lump-sum payment determined from the figures in the table."

Discussion was participated in by Messrs. Chester, Curtis, Davis, Grunsky, Humphrey, Hunt, and Talbot.

On motion of Director Humphrey, seconded by Director Hogan and carried, this suggested amendment was referred to the Executive Committee for recommendation.

Reports from the Acting Secretary on Various Activities

The following matters were reported for the information of the Board:

Conference on Unification of Abbreviations Used in Engineering Practice:

The Board at its meeting of January 17th, 1922, authorized the President to appoint a representative to such Conference; and it was reported that President Freeman had appointed Mansfield Merriman, M. Am. Soc. C. E., who has accepted.

Sidewalk Alterations to Fifty-seventh Street Property:

These alterations were required by law, and an item ($4 730) was placed in the Budget to cover it. The Board at its meeting of January 19th, 1922, authorized the President to appoint a committee to have full power to contract for this alteration; and it was reported that Messrs. Thaddeus Merriman, E. J. Moore, and James F. Sanborn, appointed as such Committee, had gone into the matter in detail, and the contract had been signed.

Fire Prevention Committee to Study the Tentative Regulations Formulated by the Committee of the National Fire Protection Association and to Cooperate with such Committee:

The Board at this meeting of January 16th, 1922, adopted the report of the Committee on Special Committees in this matter, and the President was empowered to appoint a committee of seven with the restriction that the final report must be made within a year. It was reported that the following members have been appointed as such Committee: Frank W. Hodgman, *Chairman,* John F. Coleman, John Meigs, Rudolph P. Miller, W. Watters Pagon, John Stephen Sewell, and Benjamin Thompson.

American Engineering Standards Committee:

The Board at its meeting of January 18th, 1922, authorized the President to fill the vacancy in the representation of this Society on such Committee, caused by the expiration of the term of H. J. Burt, M. Am. Soc. C. E. It was reported that H. H. Quimby, M. Am. Soc. C. E., was appointed and has accepted.

The Virginia Agricultural and Mechanical College and Polytechnic Institute:

As reply was requested by April 1st, 1922, to the invitation to this Society from the Board of Visitors and Faculty of the College to be represented by an official delegate to the exercises in celebration of the Fiftieth Anniversary of the founding of the College, on May 28th-30th, 1922, at Blacksburg, Va., President Freeman had appointed J. C. Carpenter, M. Am. Soc. C. E., as such delegate, and he has accepted.

The American Association for the Advancement of Science:

The 1923 Meeting of the Association will be held at Boston, Mass., on December 26th-30th, 1922; and President Freeman has appointed George C. Whipple, M. Am. Soc. C. E., to represent the Society at such meeting, and states that he also will attend.

Special Committee on Bridge Design and Construction:

Victor H. Cochrane, M. Am. Soc. C. E., was appointed on such Committee to fill the vacancy caused by the resignation of George H. Pegram, Past-President Am. Soc. C. E., and it was reported that Mr. Cochrane has accepted; also, that A. F. Robinson, M. Am. Soc. C. E., had tendered his resignation under date of February 28th, 1922, and that President Freeman had appointed Otis E. Hovey, M. Am. Soc. C. E., to the vacancy, who has accepted.

Sectional Committee on Unification of Specifications for Wood Cross-Ties and Switch-Ties in Mines as well as Railways:

The Executive Committee at its meeting of February 14th, 1922, authorized the President to appoint a representative of the Society, on such Committee in answer to an invitation which had been received; and it was reported that President Freeman had appointed R. V. Norris, M. Am. Soc. C. E., who has accepted.

Committee on Welded Joints:

The Board at its meeting of January 17th, 1922, appointed Messrs. E. M. T. Ryder and Howard H. George as the Society's representatives on such Committee, and their acceptances were reported.

Special Committee on Electrification of Steam Railways:

The Board at its meeting of January 16th, 1922, empowered the President to appoint such Special Committee to co-operate with similar committees of the other National Societies, provided members of National standing are found willing to serve on such Committee. It was reported that President Freeman had appointed Messrs. Charles F. Loweth, *Chairman,* B. J. Arnold, George Gibbs, George W. Kittredge, E. J. Pearson, Samuel Rea, and Robert Ridgway.

Committee on Technical Activities and Publications:

The Board at its meeting of January 20th, 1922, authorized the appointment of a temporary Special Committee on Technical Activities, and the

amendment of the By-Laws so as to create a Standing Committee on Technical Activities and Publications. The temporary Special Committee on Technical Activities was to consist of the Committee on Publications, together with other members, and the new Standing Committee on Technical Activities and Publications was to replace the Committee on Publications. The President was authorized to appoint such temporary Special Committee on Technical Activities. It was reported that President Freeman had decided that the present Publication Committee could also act on Technical Activities.

In carrying out the instructions of the Board, it was reported that the Publication Committee has approved the appointment of a Sub-Committee on Power, and the Local Sections have been asked to make suggestions as to members for such Committee.

Resignation of W. K. Hatt, M. Am. Soc. C. E., on Joint Committee on Concrete and Reinforced Concrete:

In a letter dated February 2d, 1922, W. K. Hatt, M. Am. Soc. C. E., tendered his resignation as one of the representatives of this Society on the Joint Committee on Concrete and Reinforced Concrete, on account of his duties as Director of the Advisory Board on Highway Research of the Division of Engineering of the National Research Council, and the President has the matter of filling this vacancy under advisement.

Letter of Thanks from Commissioner of Patents:

C. T. Purdy, M. Am. Soc. C. E., in a letter dated March 22d, 1922, enclosed a letter he had received, dated March 17th, 1922, from Commissioner Robertson, of the U. S. Patent Office, expressing the thanks of the 1 016 employees of the Patent Office, for help in effecting the passage of the Patent Office Relief Bill.

Action on Applications for Membership

The following motion was made by Vice-President Hunt, seconded by Past-President Davis and carried:

"*Moved,* That each Director be instructed to take up with each Local Section in his District the responsibility resting upon the sponsors for applicants, impressing upon the individual members the obligation they owe to themselves, the membership at large, and the Society in the premises."

Local Sections Protest Against Re-Districting

The following resolution adopted by the Colorado Section at its meeting of March 27th, 1922, was presented:

"*Whereas,* It appears that the Colorado Section has been included in District 11 of the adopted distribution of members of the American Society of Civil Engineers; and

"*Whereas,* A very large proportion of the members of the proposed district are situated in a group in the extreme southwest corner of the district area far removed from the center of membership of the remainder of the district; and

"Whereas, The interests and activities of these members will have little in common with the remainder of the district; and

"Whereas, The Colorado Section has heretofore protested against a similar grouping;

"Be it Resolved: That the Colorado Section of Members of The American Society of Civil Engineers protests against the grouping as adopted for District 11 and respectfully requests a re-arrangement of the districts in a manner more consistent with the interests and activities of the Local Section."

Vice-President Hunt moved that the Secretary be instructed to write to the Colorado Section that the matter cannot be brought up for action until the January, 1923, meeting, when the re-districting will be taken up again, and that it will be referred to the Committee in charge at that time.

Director Henny suggested that the Colorado Section be asked to propose a re-districting which would be satisfactory to it, and Vice-President Hunt accepted this suggestion, whereupon the motion was duly seconded and carried.

Communications from Director Huber and Secretary Dewell of the San Francisco Section, protesting against the boundary of Districts Nos. 11 and 13, were reported. This matter had been discussed at the morning session when the minutes of the meetings of the Executive Committee were approved, which Committee had authorized the insertion of certain longitude and latitude divisions.

As the Constitution provides for the review of the districting each year by the Board, it was decided that this matter would go over until 1923.

Advisory Committee on Official Water Standards

A letter of March 20th, 1922, was presented from Surgeon General Cumming, of the U. S. Public Health Service, explaining that in order that the Treasury Department Standard for Drinking Water used by common carriers operating in interstate traffic may be made more applicable in accordance with present water supply conditions, an Advisory Committee of scientists capable of passing on official water standards is being formed by the Surgeon General of the Public Health Service, and this Society is invited to designate a representative as a member of such Committee.

On motion of Vice-President Grunsky, seconded by Director Chester, and carried, the President was authorized to appoint such representative.

Conference on Business Training of the Engineer and Engineering Training for Students of Business

This Conference is to be held under the auspices of the Committee on Commercial Engineering, and an invitation which had been received by this Society from Dr. Glen Levin Swiggett, dated March 13th, 1922, inviting this Society to appoint delegates to such Conference, was presented.

On motion of Director Humphrey, duly seconded and carried, the President was authorized to appoint six delegates.

President Freeman subsequently appointed Messrs. John N. Chester, Robert A. Cummings, George S. Davison, Richard Khuen, Jr., E. K. Morse, and Samuel A. Taylor.

Annual Meeting of the American Academy of Political and Social Science

A letter dated February 21st, 1922, was presented from L. S. Rowe, President of the American Academy of Political and Social Science, inviting this Society to appoint three delegates to attend the Annual Meeting of the Academy to be held on May 12th and 13th, 1922, at Philadelphia, Pa., when "The Relation of America to the Rehabilitation of Europe" will be discussed.

On motion of Director Humphrey, seconded by Vice-President Wall and carried, the President was authorized to appoint the three delegates requested.

President Freeman subsequently appointed Messrs. William Easby, Jr., Benjamin Franklin, and Edward B. Temple.

Sequence of Annual Conventions

It was reported that there are now fifteen Districts instead of thirteen. This will change the sequence adopted in 1916* for holding the Annual Conventions of the Society, and the following sequence was suggested for approval:

In	1923,	District	No. 5.	District of Columbia, Maryland, Virginia.
"	1924,	"	" 11.	Arizona, California (south of N. Latitude 36° 30′), Colorado, New Mexico, Utah, Wyoming.
"	1925,	"	" 9.	Indiana, Kentucky, Ohio.
"	1926,	"	" 4.	New Jersey (outside of District No. 1), Delaware, Pennsylvania (east of W. Longitude 78°).
"	1927,	"	" 3.	New York (outside of District No. 1), Quebec, Canada.
"	1928,	"	" 8.	Illinois.
"	1929,	"	" 13.	California (north of N. Latitude 36° 30′), Nevada.
"	1930,	"	" 14.	Missouri, Arkansas, Louisiana.
"	1931,	"	" 7.	Iowa, Michigan, Minnesota, North Dakota, South Dakota, Wisconsin, Manitoba, Canada.
"	1932,	"	" 15.	Nebraska, Kansas, Oklahoma, Texas, Mexico.
"	1933,	"	" 2.	Connecticut (outside of District No. 1), Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, New Brunswick, Canada, Nova Scotia, Canada.
"	1934,	"	" 6.	Pennsylvania (west of W. Longitude 78°), West Virginia, Ontario, Canada.
"	1935,	"	" 12.	Idaho, Montana, Oregon, Washington, Alaska, Alberta, Canada, British Columbia, Canada, Saskatchewan, Canada.
"	1936,	"	" 10.	Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee.

Discussion on this change was participated in by Messrs. Anderson, Chester, Curtis, and Humphrey.

On motion of Director Humphrey, duly seconded and carried, this sequence was tentatively approved, with the understanding that when the International Engineering Congress is held in Philadelphia, Pa., in 1926, that city will receive preference for the Annual Convention that year.

The Board adjourned at 10:45 P. M., to meet at 10 A. M., April 4th, 1922.

* *Proceedings*, Am. Soc. C. E., November, 1916, p. 699.

April 4th, 1922.—The Board reconvened at 10:15 A. M.; President John R. Freeman in the chair; Elbert M. Chandler, Acting Secretary; and present, also, Messrs. Anderson, Brown, Chester, Curtis, Darrow, Davis, Dyer, Greene, Grunsky, Henny, Hogan, Holland, Huber, Hudson, Humphrey, Hunt, Marston, O'Connor, Pegram, Ridgway, Talbot, Wall, Webster, Winsor, and Yates.

Society Meeting on Pacific Coast and Quarterly Board Meeting

Extended discussion was had as to the date of the 1922 Fall Society Meeting, when a Symposium on Water Power will be held, to be preceded by the Quarterly Board Meeting, which was participated in by Messrs. Anderson, Chester, Curtis, Grunsky, Henny, Hogan, Huber, Humphrey, Marston, Webster, and Winsor, and included a show of hands as to the sense of the Board regarding certain dates.

A letter of February 1st, 1922, was also presented from Secretary Fowler, of the Seattle Section, asking if it would be possible to hold these meetings in Seattle, Wash.

After the offer of several tentative motions, the following motion by Director Humphrey, which was seconded by Director Chester, was carried:

"That the meetings be held the first week in October in San Francisco, California."

Subsequently, at the evening session, Director Huber read a telegram from the San Francisco Section, and moved that the Board meet in San Francisco, on October 2d-3d, 1922, and that the Society meetings follow.

This motion was then seconded by Director Hudson and carried.

On motion of Director Hogan, duly seconded and carried, the date of the Intermediate Board Meeting was changed from September 11th, 1922, to August 28th, 1922.

Pins for Students and Juniors

At the meeting of the Board of January 16th, 1922, the Acting Secretary was instructed to investigate and report on the matter of pins for Student Chapters and Juniors, in accordance with the report of the Committee of the Board on Student Chapters. Two designs were submitted, a small white button with a blue shield superimposed for Juniors and a maroon shield for Students.

Discussion as to these designs was participated in by Messrs. Chester, Davis, Holland, Huber, Hudson, Humphrey, Marston, and Talbot.

Final action was taken in the adoption of a motion by Director Hogan, seconded by Director Marston, approving Design No. 2 as the form of badge for Students and Juniors, with the omission of the word, "Student" and "Junior", centering the shield, and having "American Society of Civil Engineers" printed in full, retaining the circumscribing circle.

On motion of Director Marston, duly seconded and carried, the price of these pins was fixed at $1, and the Acting Secretary was instructed to notify the Student Chapters and publish an announcement in *Proceedings* of the price and date when pins will be available.

Notice was given of a proposed amendment to Article V of the By-laws by adding to Section 7 thereof, Paragraph (*d*): "and the right to wear a badge of design prescribed by the Board of Direction."

This is to be regarded as the requisite written notice to the Board of this proposed amendment to the By-laws, and the matter will come up for final action at the June meeting of the Board.

Federal Charter

The desirability of the Society securing a Federal Charter was discussed by the Board of Direction at its meeting of January 17th, 1922, and this matter was referred to the incoming Board. The incoming Board at its meeting of January 19th, 1922, decided to postpone consideration of this matter. Clemens Herschel, Past-President, Am. Soc. C. E., in a letter dated February 10th, 1922, suggests getting legal advice.

Vice-President Hunt made the following motion, which was seconded by Director Humphrey and carried:

"That the Chair be authorized to appoint a committee of three (Mr. Herschel to be a member thereof) to report to the Board the advantages and disadvantages, and the reasons in favor or against such action."

Local Sections

The proposed Constitution of the Virginia Section was presented to the Board at its meeting of January 17th, 1922, and it was decided that such Constitution would have to be amended to conform to the standard before the Board would approve it.

A letter dated March 1st, 1922, from James F. MacTier, Assoc. M. Am. Soc. C. E., was reported authorizing the necessary changes to make the Constitution of the Section conform to the standard.

On motion of Director Marston, seconded by Vice-President Grunsky, and carried, the Constitution of the Virginia Section was approved.

A petition for authority to form the Lehigh Valley Section signed by twenty-two members, under date of March 31st, 1922, was presented, together with accompanying proposed Constitution, which was reported to be in correct form.

On motion of Director Hudson, duly seconded and carried, the Constitution of the Lehigh Valley Section was approved.

The proposed new Constitution of the Portland Section was presented, it being reported that the Constitution is in correct form, except Article VI, Amendments, which provides that "This Constitution may be amended only by an affirmative vote of two-thirds of all ballots cast by members of the Section." It should contain the clause, "provided the total number of voters shall be not less than a majority of the whole membership."

Director Henny moved the approval of the new Constitution provided it is changed to conform to the standard, which motion was seconded by Vice-President Ridgway and carried.

It was reported that the Constitution of the Iowa Section was approved by the Board of Direction in 1920. At that time the Constitution as approved contained the following article:

"ARTICLE II.—MEMBERSHIP

"*Section 1.*—The membership of the Association shall be restricted to persons who are members of the American Society of Civil Engineers in any grade. All such members resident in Iowa automatically become members of this Association without payment of entrance fee, but should membership in the American Society of Civil Engineers of any person cease from any cause, he shall at the same time cease to be a member of this Association."

This Article which is not in accordance with the standard Constitution, was not especially called to the attention of the Board, and as the Board at its January meeting refused to approve the Constitution of the proposed Virginia Section because it contained a similar provision, the matter is reported to the Board.

There was some discussion by Messrs. Davis, Hogan, Hudson, Humphrey, Marston, and Talbot, the possibility of having Local Sections maintained entirely by funds from the Parent Society being mentioned.

On motion of Director Marston, seconded by Vice-President Grunsky, and carried, the Acting Secretary was instructed to call the attention of the Iowa Section to the necessity for changing its Constitution to conform to the standard.

PLANS TO INCREASE MEMBERSHIP

The following letter dated March 9th, 1922, from President Freeman was presented:

"Since the Society urgently needs more money for expanding beneficial activities and committee work, I recommend for your consideration ways and means for a dignified campaign for increased membership, on the theory that we are doing a worthy engineer a favor by inviting him into the benefits of membership.

"This campaign must be planned and executed very discreetly so that we invite only worthy members and I suggest that it be thought out on the lines of taking our Geographical Directory in our Year Book in hand and address to members selected in each town the suggestion which I have voiced above and ask if he, with his friends, will not constitute a little local committee to investigate the possibility of there being worthy candidates among his neighbors who could be made to see the value to themselves of membership, with its various privileges and opportunities including that of the *Transactions*."

Director Marston moved that the recommendation of President Freeman be carried out.

This motion was seconded by Vice-President Wall, and carried.

Director Brown moved and Vice-President Wall seconded the motion, which was carried, that this action be conveyed to the President and Secretary of each Local Section.

Director Anderson spoke of the desirability of Associate Members forwarding applications for transfer and Messrs. Brown, Darrow, Davis, Henny, Hogan, Humphrey, and Marston also spoke.

Director Humphrey stated that the Philadelphia Section wishes to revise its Constitution, and asked whether the Board would tentatively approve such revision if it conforms to the standard.

Director Hudson made such motion, which was seconded by Director Humphrey, and carried.

Meetings of Presidents of Local Sections

A letter dated February 24th, 1922, was presented from Frank B. Sanborn, Chairman of the Northeastern Section, stating that an informal meeting of the Chairmen of the Sections was held during the 1922 Annual Meeting and that he believes such meetings once or twice a year would develop interest in the Society and help to harmonize its action.

Director Humphrey moved:

"That the Board approve of an annual meeting of the Presidents of Local Sections."

Director Marston, seconded the motion. Messrs. Davis, Henny, Hogan, and Ridgway discussed the matter.

The President declared the motion carried.

John Fritz Medal

A letter dated January 20th, 1922, was presented from Chairman Swasey and Secretary Rand of the John Fritz Medal Board of Award, explaining that the Board has approved the proposal to print and re-issue the John Fritz Medal Book to bring it up to date. Since the first issue of the book, five additional awards have been made of the Medal. The estimated cost is $940, and this Society was asked if it would approve of the issue of such book and bear one-fourth of the cost, not exceeding $250.

At the meeting of the Founder Societies Joint Finance Committee on February 8th, 1922, it was decided to recommend to the governing boards of each Founder Society, that an appropriation of $250 be included in the 1923 Budget as a contribution toward this expense.

Director Humphrey so moved, and this motion was seconded by Vice-President Hunt, and carried.

Local Sections and Federated Societies

A letter dated March 30th, 1922, from Secretary Dewell, of the San Francisco Section, was presented, asking if there would be objection to the Section joining the Federated California Technical Societies.

On motion of Director Humphrey, duly seconded and carried, the Acting Secretary was instructed to inform the San Francisco Section that the Board has no objection to the Local Section joining the federation named.

Report of Committee on Research

Chairman Talbot, of the Committee on Research, made a verbal progress report, and asked for the authorization of the following committees, explaining that others are still under consideration: On Stresses in Structural Steel, Irrigation Hydraulics, Hydraulics Phenomena, Impact in Highway Bridges, and Flood Protection Data.

Discussion was participated in by Messrs. Darrow, Hudson, Humphrey, Marston, and Talbot.

On motion of Past-President Talbot, seconded by Director Hudson, and carried, the President was authorized to appoint these committees.

The report of the Membership Committee was presented.

On motion, duly seconded and carried, the recommendations of this report, which was not read, were adopted as the action of the Board.

The Board adjourned at 10:30 P. M., to meet at 10 A. M., June 19th, 1922, at Portsmouth, N. H.

ADDRESS OF WELCOME AT THE MEETING OF THE SOCIETY, DAYTON, OHIO, APRIL 5TH, 1922

By Col. E. A. Deeds.*

It is indeed a great pleasure to be here this morning. It is a great day for Dayton, and it gives me the greatest pleasure to welcome you in the name of our Engineers' Club. We have 575 members of this organization residing in the Miami Valley. You are doing us a great honor to come here and be with us. Your presence will encourage us much and be a great inspiration to the younger members of the organization. This meeting will give us a broader vision of our opportunities and duties as a Club.

Again, in the name of the Miami Conservancy District and in the name of this Miami Valley which owes so much to you and your organization, I want to welcome you.

Those of us who have grown up in this industrial valley as mechanical and electrical engineers, did not know much about the civil engineering organization prior to the flood; but we do know something of your organization now, because of the men who came into this Valley to solve this great flood problem. The finest group of men who ever came into the Miami Valley, came in for this purpose. They have endeared themselves in the hearts of the people, they have given your organization a standing and a reputation here which are enviable.

When we first started on this work, we had little realization of what the problem was. We had never seen the civil engineering problems being met in the larger way. When we started this work, we started it hesitantly, but seriously. We studied the problem and found that there was a solution. When this was found, we went to work to bring it about. When it came time to start construction, we started it without any demonstration. When the first dragline was on the ground and had steam up, we started to dig.

We have no plans for any formal demonstration when the work is finally finished. We propose to finish this work and turn it over to the coming generations as quietly as it was begun. If there is to be any formal demonstration, we might consider your meeting as celebrating this event. And what could be more appropriate? We are to-day honored with the presence of the American Society of Civil Engineers whose experience and personnel have made this great work possible. We then, to-day, formally dedicate this great project and with your blessing it goes on its great mission of mercy for centuries to come.

I hope that this meeting in Dayton (and we feel complimented that your first meeting away from New York City is here with us), as you devote time to the study of the flood problems, will be only the beginning of a number of such meetings, at which is discussed this most vital subject.

Any information or experience we have here that may be helpful to you in the future, is at your disposal. We ourselves are at your disposal, any

* Chairman, Board of Directors, Miami Conservancy Dist., Dayton, Ohio.

time, anywhere, to assist in the great work of flood control. We are indebted to your organization for making this great work possible and will be ever ready to reciprocate. To this I can only add again our most hearty welcome.

REPLY TO ADDRESS OF WELCOME AT THE MEETING OF THE SOCIETY, DAYTON, OHIO, APRIL 5TH, 1922

By John R. Freeman, President, Am. Soc. C. E.

Mr. Chairman and Fellow Engineers: We of the American Society of Civil Engineers are most appreciative of the kind welcome that has been given us. This is the third notable welcome we have had since the Board of Direction of the Society first came in advance to Dayton, and all have been most hearty and genuine and have made us feel thoroughly at home.

I made my response to the first addresses of welcome by Governor Cox, Commissioner Deeds, and Chief Engineers Morgan and Paul at the Dayton Engineers' Club, and I do not know that I can do better now than to repeat some of the things I said then.

I said that of all the studies of flood problems that I had known in any city of the world, I had never known of one that was taken hold of with more vision, broader horizon, and a finer scientific spirit. Very often after a great flood there is a spasmodic investigation, and the curbstone engineers, the citizens' committees, and various people all tell what to do; there is great temporary excitement and a promise of great things, but very often all of that immediate interest evaporates, without leaving much behind.

This case of the Miami Conservancy, I think, stands out among all others in American cities, in the prompt way in which your committees and your engineers began their work, and the scientific way in which they "made haste slowly" in the early stages. The scientific studies that were made of flood problems all over the United States—the studies of rainfall and run-off and the mathematical studies of means for dissipating the energy that would be generated in the discharge from these great conservancy dams—were made with a thoroughness that has aroused the admiration of engineers throughout all this country.

Usually, it is the experience that all such good things in administration originate with a small group of men, and sometimes they originate largely with one man. In this work, most of us have found out who the one man was. One might say, in the words of a famous epitaph, "If you would see his monument look about you"—for the monument of Col. Deeds is all around you, up and down this Miami River and in this club house within which we are meeting. In talking with Col. Deeds, I remarked on the pleasure it must give him to see the happiness that he and his partner had brought into the lives of all these young men meeting week after week in this admirable

club house; and he replied, "One can have a lot of enjoyment in being his own executor". I hope he will reap the full measure of pleasure that should come for all these good works.

The American Society of Civil Engineers is just seventy years old this year. There is an older organization which, as you know, is the most dignified body of its kind in the world—the Institution of Civil Engineers in London. In the charter of that great Institution the work of the civil engineer is defined as directing "the great forces in Nature for the benefit and convenience of man". There certainly are few greater forces in Nature than the flood which came down this Valley; and your engineers seem to have been justifying the old definition of the Profession by directing the Miami floods so that when one comes again, it will not come through the main streets of Dayton.

There will be benefits from all this work far more widespread and lasting than those to the City of Dayton alone, from the preliminary scientific studies to which I have already alluded, and from the bulletins that have been published of the progress of your work from month to month. Those preliminary memoirs and bulletins are filed in the libraries and offices of engineers all over this country, and far beyond this country, as may be illustrated by the fact that, among others, I subscribed for extra copies of those bulletins and sent them to far-off China, where I know they will do great good.

Among the final work here was one of the most beautiful tributes of the Dayton Conservancy engineers to the good cause of flood protection all over the world, in the eight monographs that have been published, giving the results of the various scientific studies made in the course of the designing and building of these works.

That broad spirit of loyalty to the Profession and the good of mankind has been shown through everything, and that is why this Miami Conservancy work is going to be of far more value and more far-reaching than the Miami Valley.

We have, as Col. Deeds has said, great need for the study of problems of protection against floods in many localities. Those who have eyes trained to read the story in the gorges and ravines and in the face of Nature itself, can see plenty of evidence that, from time to time, these great floods and cloudbursts occur here, there, and almost everywhere, throughout this broad country of ours. Fortunately, they do not come very often. Many of the valleys and ravines that we see, could have been sculptured in no other way than by one of these great storms, and when one looks closely and steadfastly, it is surprising how full a record one can see of these great floods—all the warning that man needs.

There is an interesting instance of the late James B. Francis, Past-President, Am. Soc. C. E., searching and finding such a warning. In his early years, Mr. Francis came into large responsibilities in the management of the water power company, at Lowell, Mass., on the Merrimac, and in looking around he detected marks of a great flood long past. He then investigated the traditions of early settlers in the valley, and tried to find accurate information, by systematic study, about the worst that might happen from such a

flood if it should be repeated under present conditions of building and river obstruction.

It is surprising the number of ancient marks that can be found in almost any valley, if a systematic canvass of every farmhouse is made. I have been astonished after starting out on a search of that kind, where there seemed to be very little reliable information, to find after we had completed a house-to-house canvass in the valley, and had run a line of levels over all the flood marks shown by old residents, that we had the finest kind of a record; and I believe that a good and sufficient record for purposes of warning can be found in almost all the valleys subject to these floods. The warning signals are there, if only we have the eyes to see them and will take the time to look for them.

Returning to this case of Mr. Francis at Lowell, he found records of a flood greater than that within the memory of the oldest inhabitants, and having charge of the works of the water power company along the river, and the land on which to build, he forthwith proceeded quietly to build a dike and a great flood-restraining gate across the old Pawtucket Canal. The work was conspicuous and excited comment, not only among his own directors, but among the citizens. The dike and gate were often spoken of as "Francis' Folly". They stood there, apparently absolutely useless, as I remember the story, for something like twenty years. There was no mechanism for hoisting this gate—merely a simple mechanism for dropping it, which consisted of a large iron suspension stirrup with a cold-chisel and a hammer placed near-by.

Finally, suddenly, the flood came—greater than any within the memory of man then living—that iron strap was cut, the gate fell, and Lowell was saved from any such inundation as was experienced here in Dayton. The gate and dike no longer were called "Francis' Folly", and to atone for past misjudgment, the grateful citizens presented Mr. Francis with a beautiful set of solid silver table ware. All over this country opportunities exist for similar beneficent work in finding out what is likely to happen before it actually does happen.

For a great many years, I was connected with a water power company which maintained records of floods and continuously studied the flow of water on the river. I had been very much interested in the great rainfall of October, 1869, and of the flood which this caused on the Merrimac River. The story of this had been compiled by Mr. Francis. In that flood, there was just about the same depth of rainfall that you had here in the Miami Valley in 1913. The storm of 1869 swept over an area of something like 10 000 sq. miles, the Merrimac River rose to a depth of 10 ft. over the crest of the Lawrence Dam, and had a discharge of 100 000 sec-ft. at the peak of the flood.

Later, in 1878, I had occasion to follow the course of another flood at the same dam, which rose nearly to the same height and was caused by a rainfall of only one-half the amount that had fallen in the earlier flood. In the earlier flood, there had been a rainfall of 10 in. In this later flood, it was 4.78 in., as I now remember, less than one-half the rainfall of the earlier one. Yet it produced a flood of equal size. The reason was that the first flood came

when the ground was absorptive, and the second flood came when the ground was frozen and the water nearly all ran off. Conceive of the rainfall of 10 in. on non-absorptive ground, and you have a condition worth thinking about.

In coming to Dayton for this meeting, we have three special objects—to learn what we can about your great flood, to see the works that you have built for preventing disaster from even a greater flood, and to hold this symposium and get together all the data that we conveniently can of similar flood problems, with a view to awakening interest all over this land, and preventing such disasters as that which swept down this Valley.

FACTORS IN ENGINEERING ACCOMPLISHMENT, THE MIAMI CONSERVANCY PROJECT

ADDRESS BY ARTHUR E. MORGAN,* M. AM. SOC. C. E., AT THE MEETING OF THE SOCIETY, DAYTON, OHIO, APRIL 5TH, 1922.

It is scarcely necessary to say that the accomplishment of the Miami flood-control project was not just an engineering undertaking. The people of Dayton determined not to have a repetition of the disaster of 1913, and it was their will, their courage, and their determination that are primarily responsible for the results that have been achieved. Certain men stand out from the mass—a number of men—who gave themselves so unreservedly and so effectively that whenever I think of flood control I think of them.

There is Mr. John H. Patterson who, while the flood was occurring and afterward, put into the situation his resources, his tremendous energy, and his virility, to great effect. There is also Mr. Adam Schantz, who stood back of this work from the very beginning until his death in 1921.

Possibly, Col. E. A. Deeds has been the most active of any one in the whole undertaking. He has been behind this work with his vigor and his energy, and it is no exaggeration to say that the work of the Miami Conservancy District never would have been brought to fruition, but for the untiring, persistent, enthusiastic energy of Col. Deeds. After the work had been going on for somewhat more than two years, I was out of touch with it for about a month on account of illness. It so happened that at the same time Col. Deeds was away from the scene of action. The first day that I was able to sit up, I had a visit from three of the men who had charge of affairs here, who came to say that it was not wise longer to go ahead with the preparations as we were doing; there was no use in going ahead; that active preparation should cease; and that the engineers should be dismissed and the work practically stopped.

On account of my condition, I did not have much energy, so about all I could do at that time was to temporize and say that there were a few odds and ends that would have to be gathered together and that the engineers ought to be kept a month longer. They were kept a month longer and the evil day was staved off; by that time Col. Deeds had returned and put back into the situation that energy and virility that carried the organization over what might be termed the peak of depression.

Col. Deeds is going to tell you of the public connections of the Project, and Charles H. Paul, M. Am. Soc. C. E., will describe what has been done. I am going to tell you not what was done on this Project, but how it was done. If I were to pick a patron saint for engineers, I think I would take the deacon who made the one-horse shay. You know what he did. He worked out that design so that there was no part of the whole structure that was not exactly as strong or exactly as well proportioned as every other part. You know Holmes' poem and how the old shay ran, "A hundred years to a day", and, as the deacon was riding to church, it crumbled and he found him-

* Pres., Dayton Morgan Eng. Co.; formerly Chf. Engr., The Miami Conservancy Dist., Dayton, Ohio.

self sitting in a little heap of dust. It was so perfectly proportioned that there was no element in it stronger or weaker than any other.

That is the ideal of engineering—to use the total available resources in such a manner that every item of those resources is used where it will count the most, and also to consider every factor that enters into the problem so that in no case an undue amount of attention has been given to one factor to the neglect of some other. It is that perspective, that proportioning of the job, which makes engineering work effective, that habit of including all the factors with their true relative importance accredited to them.

That is the "a, b, c", in the technical phases of engineering, but it is no less true when every factor that enters into the accomplishment of a purpose is considered. Here, at Dayton, we wanted to prevent floods. There were many factors involved; some of them were purely technical matters that could be worked out by research and in no other way. Some were matters of routine design, but there were many other elements just as important, the omission of which would have wrecked the job just as surely and yet they were not ordinarily considered as engineering. About the first job that I undertook, after coming here, was to make a catalog of the factors that would enter into the problem, saying to myself, "This element must be considered if we are to succeed; that element may loom large, and that other one may have an important bearing", and to endeavor to see that there was no element in the whole that was not given consideration in proportion to its importance. In meeting the demands of that catalog or schedule, much of the work went far afield from what is ordinarily considered as technical engineering.

I am going to mention some of the varied factors that affected the plans, because when one seeks the final aim of engineering, it is found to be not design, not research, but accomplishment; and every factor that affects accomplishment must have attention to insure success. If the wife of the concrete inspector has indigestion and worries him so that he neglects his work, the results may be just as fundamental and just as far-reaching as technical errors in the structural design. Whatever factor enters into the completion of the job is worth consideration.

When I first came to Dayton, there were some undertakings that had to be initiated before such a catalog or such an inventory could be made. In the first place, it was necessary to develop patience. Every one wanted to start construction at once. Those in charge of the work were told that in three months there must be steam shovels in the river. The building of an attitude of restraint and of expectation of a long siege of preparation was one of the first essentials. Unless the people of the Valley could be made to see the need for a period of preparation, then fine work in research and planning would mean nothing because, losing patience, they would take up some quick method of relief.

Another of the first things that had to be undertaken was to persuade the people of the Valley that their way out was to help themselves. Those of you who have been through many such projects know well that the pursuit of Federal appropriations for such an undertaking is like chasing a will-o'-the-wisp, but whenever a big flood-control problem appears, the first appeal

is to the Government, therefore, one of the first jobs at Dayton was to get the people to see that waiting for Federal relief would be long drawn out and possibly futile in the end, and that the way for them to get results was to help themselves. That was a point of view that had to be developed quickly and effectively, so that no one would have to start off on futile trips to Washington and dissipate his energies through seeking Federal aid.

Another of the immediate necessities was that of finance. When the suggestion was made that adequate resources for preliminary investigations were fundamental, the people came back with a public contribution of $2 150 000. That was one of the most remarkable exhibitions of civic interest I have even seen, and the availability of that fund had very much to do with the thoroughness with which preparations for the job could be made.

It was then necessary immediately to make permanent the record of the flood—the record the flood had made of itself. The first parties, placed in the field within about six weeks after the flood and within three or four days after the job was started, were concerned with preserving, in accurate, tangible form, every record of importance that the flood had left, so that at later times the engineers could construct hydrographs and discharge curves and compile their data from accurate records. In that pursuit, I was often reminded of Münsterberg's book on "Evidence"—how possible it is for people, in time of stress to see what is not so.

Then began the organization of thorough-going field work. For that, O. N. Floyd, M. Am. Soc. C. E., had been brought from a project in the swamps of Mississippi. He has lived through this job to the completion of one of the biggest units. During that first season much of the burden of the field surveys devolved on him.

As the catalog of the factors that would enter into the accomplishment of our purpose was begun, the need was immediately felt of certain technical information of greater accuracy than had hitherto been available. For instance, every man present, who works on flood control, feels keenly the lack of knowledge of rainfall. Engineers must have all the information available, where the issues are as great as those on this project. A knowledge of probabilities and of the relations of time and depth and area in rainfall was the chief need. Therefore, one of the first undertakings of the early weeks of preparation was to outline a research in rainfall. The final results were issued in one of the technical reports, previously mentioned. It was thought that research would be finished in about a year, but it took between four and five years. If the immensity of the task had been realized, it is questionable whether we would have had the courage to start it.

Then, the lack of knowledge of run-off was realized. During the first few weeks, a line of investigations was formulated, that was continued for more than five years.

The engineers were aware, as all engineers are, of the somewhat indefiniteness of the reliability of stream-flow formulas and, again, a line of investigation was formulated—the men were started off before the mud had been removed from the streets of Dayton and that investigation, after three or four years, gave a sound basis for conclusions.

These investigations must be started quickly, and they were. The results that have been presented in the technical reports have followed some very fine research. To a large extent, the merit in those technical reports must be credited to S. M. Woodward, M. Am. Soc. C. E., who spent a large part of his time here for several years. To a great extent, the remainder of the organization was his helpers. The analysis of new problems that had not been made before, is largely the work of and is due to the insight of Mr. Woodward, and I believe the reputation of those reports will increase as years pass, and that the Miami Conservancy District will continue to profit by the insight that he brought to that part of the job. Among his associates, Messrs. Houk, Bock, Riegel, Matthes, and others, made effective contributions.

I always imagined that if one could delve into the archives of European engineering libraries, one would find a great reservoir of information on hydraulics and flood control. To make sure that no valuable data were being overlooked, a survey of European flood-control literature was undertaken. Kenneth Grant, M. Am. Soc. C. E., conducted that work admirably, spending about two years in a search of European flood-control literature which might throw light on the problems at Dayton.

It was soon realized that the work would have to be paid for by special assessments, so the problem of appraising benefits and damages was taken up. All those lines of investigation were started within a comparatively few weeks after we came to Dayton and had made up the little catalog of factors that would enter into the situation.

Before the work had proceeded far, it became apparent that there was no legal machinery in this State which would adequately handle such a project. Much of the research could be delegated, but that was a job where delegation did not work out well and I personally examined, sentence by sentence, practically every flood-control statute in the United States and Europe, trying to find reflected therein, the record of any experience that might be met here. The Ohio Conservancy law, under which the work is being done, is primarily a law drafted by engineers. There is scarcely a working provision in the whole law, either as to the general structure or to the detailed procedure, that is not built from an engineering standpoint and from engineering experience. When that was completed, we had the substance of a code. The attorneys of the Flood Prevention Committee took this draft and handled it in an admirable manner, checking it, clause by clause and word by word, bringing it into the legal requirements of the State and Federal Constitutions. After that, it was similarly dealt with by bond attorneys and finally emerged, after many conferences (not all of them entirely free from argument), in an instrument that has served its purpose almost without fault during this period of preparation and construction.

While these various lines of work were being carried on, it was obvious, as indeed it had been since the start, that no job like this would carry through except as it had the support of the public. We would be leaving unused our greatest assets and we would be building up possibly our greatest liabilities if we should leave, uninformed, the public that must support this undertaking and, therefore, while we were preparing the plans, while we were working out the

project, we were informing the public, we were talking at meetings, we were writing up various features of the work, and in every way possible endeavoring to have the public understand and have an insight into the job. In that particular, I believe we failed possibly more seriously than anywhere else in the progress of the Conservancy undertaking. Time after time, I brought men here from New York City, Boston, or Chicago, and I would think, "Now, I have found a man who with dignity and accuracy and yet in a popular manner, can present our project to the people". Sometimes I would find the technical ability and the drive; sometimes the popular appeal, although lacking in accuracy and dignity of expression, but not until we were actually on construction did we find a man who could be our instrument in presenting this job to the people. I believe that if a clear, simple interpretation of the job could have been made, much of the opposition we fought so hard to overcome in the territory to the north of Dayton would have been obviated. There was a place in these threads which we were trying to weave into a finished fabric, where a thread was missing, and it troubled us through the whole progress of the work.

More than that, here at Dayton where the burden of this work had to be carried, it was necessary to build in the public mind an expectation of success. That the job was possible of accomplishment is evidenced by the fact that it is done; but the possibility depended quite largely on the attitude of mind of the people of Dayton. If they believed it could be done, there was more likelihood of its being done than if they believed it impossible, and the job of building an expectation of success was an element just as vital in the progress of this work as the design of the concrete conduits. If the expectation of a successful issue of the undertaking was lacking, the way of its promoters was to be very hard, if not impossible.

I have mentioned the time when work was ordered to be stopped, which indicates how narrow a margin of courage and support they had. Col. Deeds recently remarked that if people had known, when they started on this job, the obstacles and the difficulties to be overcome, they would not have started. Why should they have known? If any one should start out in life knowing all the troubles ahead of him, he probably would want to quit before he began. It was necessary to mobilize and integrate all the resources of expectation of success, all the resources of optimism that this community possessed, and not to develop, any more than was necessary, the attitude of discouragement and of seeing troubles in the future. Therefore, it was not entirely without guile that we failed to paint pictures of future difficulties.

In October, 1913, after about five months of work, a plan had been outlined, which plan is the general method used in construction. During the development of those plans, we had the support and the assistance of a board of consulting engineers, Mr. Woodward whom I have mentioned, Daniel W. Mead of Madison, Wis., and John W. Alvord, of Chicago, Ill., Members, Am. Soc. C. E. They were of tremendous help, not only in giving us the courage of our convictions, but also in supporting us before the public.

When it was decided to build dams, we had even a more serious problem before us. If one will think back ten years and consider the attitude of Amer-

ican engineers on reservoir control for floods, one will find it was quite uniformly hostile. A few people were promoting a favorable attitude, but even that promotion was sometimes unfortunate. On the Lower Mississippi, there had been a long, hard fight over the question of reservoirs or levees. The use of levees was right; the Army engineers knew it was right—they had fought for their use, and in that fight reservoirs *in toto* were pretty well discredited. While we were struggling at Dayton to build up the expectations of success and this confidence in the job, I recall that the Army engineers came here for a brief examination and then issued a printed report to the affect that it would be an unfortunate decision to undertake relief by the construction of dams. Under the circumstances, that report was not a very stimulating incident.

As a matter of fact, we faced an adverse engineering opinion in this country, built up largely because of the opposition to reservoirs where they were in reality entirely impracticable, and carried over into fields where the question had not been carefully examined. With this widespread attitude of opposition to flood control by the building of dams, it was necessary if we were to see this job through, to bring the substantial engineering opinion of the country to our support. Here, was another factor; another thread in the fabric, that was as important as any other. We began to bring in these other engineers. It was remarked facetiously that they were brought in large groups, but here and there we brought in representative men, who carried with them the respect of the engineers of the country, and had them go over the plans as critically as they might, until their own questions had been settled and until they were ready to approve the plans definitely. There came gradually a certain approval and support from the engineers of the country, that could not have become ours without very careful preparation.

One of that group of consultants was the late Gen. H. M. Chittenden, U. S. A. (*Retired*), M. Am. Soc. C. E. He had fought valiantly against reservoir control where it was not practicable. His works were generally quoted over the United States as authority for the position that reservoir control was impracticable. That being the case, it was thought well to send for him. He came and worked faithfully and long and hard. He examined the data and kept the office force busy supplying him with information. He seemed indefatigable, and when he had finally satisfied himself as to the correctness of our position we had nowhere a more enthusiastic supporter. Gen. Chittenden gave much of the energy of his later years in helping us to gain the good will and the approval of the Engineering Profession. If we had failed to bring that thread into the weaving, I question whether we would have been successful.

When the conclusion was reached that a series of dams must be constructed here, the job began to take more or less specific form. One could begin to see what kind of an organization would be required. One could see that whoever came here, would do well to have a period of apprenticeship, and, therefore, we began to select the permanent personnel, which was done with a great deal of care. I feel more proud of that than any other feature of the work. I think the results speak for themselves. The success of the Miami Conservancy Project is largely built around the success achieved in

selecting this group of men. There was developed not only ability, but loyalty. Of the division engineers on the five dams and the river improvement channels at Dayton and below, there were seven or eight who came on the job shortly after the general type of protection was decided. Of those, Alfred B. Mayhew, Assoc. M. Am. Soc. C. E., was drowned during the progress of the work. We, his friends, pay tribute to his fine loyalty and solid ability. All the others have stayed through these eight years and have seen the job to completion. That, I think, is admirable evidence of interest and loyalty. I know that some of those men were tempted elsewhere at salaries that we did not meet.

So the work was continued until the summer of 1915, when we were able to organize the Conservancy District. About that time, Mr. Mead took charge of the work for about five months while I was recuperating from illness. His work was of inestimable value. In the latter months of 1915, we located Mr. Paul. That was one of the important events in the development of the conservancy work. It had reached a point where the general design was about completed, where the general features were about determined, where the various investigations were under way, but where we needed to "get down to brass tacks", where specific design was needed. After being here for six months or a year—I have forgotten how long—getting acquainted with the work, Mr. Paul became Assistant Chief Engineer and his administrative ability with his judgment and common sense that he got over there in the Massachusetts hills somewhere, has been one of the mainstays of the Conservancy District.

Little by little, all these threads of the fabric were drawn together, until a pretty well developed design had been prepared. Here and there, a thread slipped, as I mentioned in the case of publicity. The fact that we did not slip very often was due to the personnel. I might say that it was clear from the beginning—from near the beginning, at least—that this was not a one-man job. If it could be done, it was because it could be delegated, and it was the fact that it was delegated—that no one tried to do all of it himself—that makes it a real job. The work Mr. Woodward did in technical research will stand, I believe—some of it—for 100 years as a classic in its line, because we got him on the job and let him alone. The work of the design of the structures was handled by Walter M. Smith, M. Am. Soc. C. E., another piece of delegation in which we did not fail.

In the case of the division engineers there was also delegation. I wish that time permitted me to give credit to these, admirable men, one by one. As soon as somebody would show his head and carry a bigger load, he got it. When Mr. Paul came on the job, we started to load him up to see how much he would take, but we never got him loaded to that point. I do not know yet how much he can carry. Little by little that delegation of engineering functions became fairly complete. Then, in the latter part of 1917, we began to need delegation of another kind. We had reached the point where we were ready to begin construction, and for some months we had contractors come and consult with us as to how they would do the job in the event they should be successful bidders; as to how the job ought to be handled. They were here presumably getting ready to bid, but in reality they were taking a civil

service examination. Some of them approached the work with a keenness and a sureness that was admirable, whereas others fumbled and said, "We have a way to do this". In this stream of men that flowed through the office, one man came whose incisiveness of mind, definiteness of perception, and keenness of imagination and understanding made a tremendous impression on us. The result was that when we looked for some one to take over the burden of construction, we picked Mr. Locker and we have had no regrets. It has been one of the triumphs of our progress that we found Mr. Locker. He did not come here for the income, but for sportsmanship, and he did his work with the spirit of a sportsman and not with the spirit of one who works for gain. The integrity of these structures will be a monument to him and his assistants long after we are gone.

When it came to the construction, we again had to extend this catalog of factors that entered in the situation. We had to consider what makes a good job. Partly, it is numbers of men and skill, but there are other factors. We believe that when a man lives comfortably, when the stress of his living environment is taken away, he can work more effectively. Therefore, we worked out housing for these people and built little villages where the environment was convenient and pleasant, where the women folks could have water in their houses and grass in the front yards and where there could be set down a normal, decent American environment. Having that, we were able to secure a different type of man than if there had been only shacks. That was perhaps particularly true of the directive forces. The turnover in the forces to which we furnished housing, was very small indeed. The effect of other conditions on them was considered; schooling for the children was furnished. It seems like a "high-brow" thing to do, or visionary, and yet when you get close to a man's heart, when you get close to his interests, you will find that the conditions under which his children are growing up are vital to him and by furnishing, in those communities, high-grade school facilities for the children, we were touching a real factor that entered into the success of the project. Their health conditions were considered; decent water supplies were furnished. Dr. Smalley, the physician, has been a genius. (I wish there were another place in the country where he could drop in, because he fits that kind of a job.) If a family was out of order, he put it in shape; if there was discouragement there, he cleared it up. He lifted those people along and kept up their courage and their spirits. I think he was just as effective a unit in the accomplishment of the purpose as the man who did the designing in the office. In estimating the factors that enter into the successful accomplishment of this project, we tried to make an environment in which a man could work effectively and in comfort and contentment.

Mr. Paul's work on the Arrowrock Dam had given him a mastery of administrative methods that we leaned on very heavily, indeed. The organization of the accounting department, the traffic work, the warehouses, etc., was Mr. Paul's work and without that we would have been very lame indeed.

In brief, this is how we did the job. Little by little, we found here and there a by-product we could get. The technical reports that have been issued may not seem to have any bearing on the dams—the dams will not stand any

longer, perhaps, because those reports are issued—but it seemed fitting, if we could extend and expand the range of information, that it was our duty to make that information available rather than keep it in our own archives; and that we should in some degree repay the great debt we owed to pioneers in engineering research.

There is one piece of work I did not mention in our technical researches, that should be mentioned. We had a tremendous job in working out the correlation of all the factors of an engineering design. As Col. Deeds often remarks, we would change one element in one of these dams or channels, and it affected the whole structure; just as when you punch a jelly-fish, it trembles all over. Every change affected every other change, and here we labored year after year—the whole force of seventy-five engineers—to get the final economical combination of all those variables. This was finally accomplished by a sort of rule-of-thumb method and we were very proud of that accomplishment. We were about through, when we wrote a technical report on it to describe how we did it. The proof was handed to one of the younger engineers, E. W. Lane, Assoc. M. Am. Soc. C. E., who brought it back a month or two later, with a clean-cut method of arriving at the ultimate economy of design by a process of analysis that would have saved many weary months of work and a great many thousands of dollars. This brilliant piece of work on the part of Mr. Lane will, I believe, have decided value in the future. Mr. Lane is now in charge of some work in China, and I can see there the same acumen and keenness in approaching his problem, that was shown on this research job.

One of our main undertakings when we started out here was to find men who could do this thing, to find men who had the ability for each separate responsibility and, little by little, to get the job delegated so that it would be well done. That delegation was effective. It was so effective that I have been for the past year or two becoming more and more a supernumerary. It is almost a year now since I ceased to have any real directing function and on September 1st, 1921, I resigned. Mr. Paul has entered into the work with a thoroughness and effectiveness such as the organization never saw before, and he is finishing it with a credit that is not apt to be exaggerated.

ITEMS OF INTEREST

This Society is not responsible for any statement made or opinion expressed in its publications.

The Committee on Publications will be glad to receive communications of general interest to the Society, and will consider them for publication in *Proceedings* in "Items of Interest". This is intended to cover letters or suggestions from our membership concerning matters which are not of a technical character. Such communications, however, must not be controversial or commercial.

Unemployment Situation Is Improving

In a statement describing the unemployment situation for the past three months, Mr. Walter V. Brown, Manager of the Federated American Engineering Societies Employment Service, said that a period of marked betterment had set in.

For the last three months the outlook has grown more hopeful. Increased employment opportunities prevail rather uniformly in the major branches of engineering. The Unemployment Service has placed 870 men in engineering positions since January 1st, 1922. At present, from ten to fifteen professional engineers a day are finding places.

The demand for radio apparatus is exceeding the supply, and is likely to exercise a growing influence on unemployment conditions. The Executive Board of the American Engineering Council, of which Dean Mortimer E. Cooley, M. Am. Soc. C. E., of the University of Michigan, is President, has authorized the appointment of a special committee to investigate conditions among engineers. Dean Cooley stated that it was the purpose to formulate a permanent and constructive engineering policy as to unemployment.

The re-opening of the copper mines, and the relief which the mining industry in general is beginning to experience, has not produced any marked effect on the unemployment situation among mining engineers. Most of the calls for mining engineers have come from South American countries, to which twenty men have been sent recently to fill responsible and generally remunerative positions.

About 3 000 applications are now on file at the Unemployment Service. This number has not increased during the last month, as it had during previous months. The Volunteer Committee of Engineers to aid in finding jobs for members of the Profession has been increased to thirty-five members, working in the Metropolitan District. Similar committees are at work in other cities of the United States. Mr. W. N. Gately who is active in the local volunteer work, states that the volunteers are making marked progress in extending the scope of the engineer to new fields.

Suggestions from the Voluntary Committee of the Employment Service

The experience gained by interviewing hundreds of employers and thousands of employees seems to prove that the average job hunter passes through three stages before making a new connection.

The first may be likened to that of a chicken which has recently been deprived of its head. First, comes the severing blow of discharge, followed quickly by a wild spattering of messy letters, fit only for the waste basket, and a mad aimless rushing hither and thither after jobs for which he is unfitted. Should any one dare to offer the kindly suggestion that he is reaching for something beyond his grasp, the applicant sees a diabolical attempt to keep him out of work and bull-headedly insists on having his way, blindly ignoring the fact that he is wasting his time and hurting the Bureau.

Meeting with no success, he is overcome with an enervating feeling of maudlin self-pity, and proceeds to give an excellent imitation of Sir Isaac Newton discovering the law of gravity. Although the achievements of great scientists are always worthy of imitation by engineers, there is little chance these days of a job falling into the lap of any man. At this stage, he spends a goodly part of his time in composing bitter arraignments of the inefficiencies of the Bureau (unmindful, perhaps, of the fact that his contribution toward its support amounts to just 25 cents per year), and is quite firmly convinced that the hand of both God and man is turned against him.

He finally reaches the third stage where he decides to quit imitating the ostrich, withdraws his head from the sand of ignorance and personal prejudice, and faces the cold hard facts. Now, something can be done to help him.

To get a job one must sell one's services. Unfortunately, the prospect of having to go out and attempt a sale seems to throw most engineers into a blind unreasoning panic, owing, doubtless, to a childlike acceptance of that most fallacious, although generally accepted, statement that an engineer cannot make a good salesman. Surely a man who understands human nature, knows his goods, thoroughly believes in them, and displays a reasonable amount of enthusiasm in presenting them, should stand a good chance of making a sale. The trouble with the engineering job hunter is that he does not know his goods, consequently, he has not a strong belief in them and instead of presenting them with a show of sincere enthusiasm, tries to cover these defects with a bluff, appearing, therefore, either as a "know it all" or a charity seeker.

When an employer desires a man to fill a specific opening, he always has a well defined idea of the kind of man he wants, and that applicant is successful who most closely approximates that ideal. True it is that one occasionally meets a man who seems not to know what he wants—and this is really the easiest type of man to deal with if the applicant knows and believes in himself. The employer's nebulous ideas can often be crystallized into a form according almost exactly with the qualifications of the applicant. Unfortunately, most applicants seek merely a certain salary and are ready to take almost any kind of a job which will pay it. Hence, to a prospective employer they appear weak, doubtful of their own capabilities, and create a negative

impression on him. Remember, always, that when a man is hired, a contract is made and a contract has been well defined as "a meeting of two or more minds". How, then, can two minds meet, when only one of them has a well defined set of ideas? Therefore, the first thing for a man to do is to draw up a detailed list of his qualifications—personal, educational, practical. Let him play fair with himself and note both strong and weak points. Here, he begins to make progress, for ambition will force every normal man to seek remedies as soon as he recognizes his weaknesses. Next, he should combine this detailed list of qualifications into a clear, concise, forceful experience record which will show him in the best light possible. This is the hardest part of the whole task and will require not an hour, but more often days of hard, consistent, even painful effort. When properly done, however, it creates a wonderful feeling of confidence, and gives him a sharply defined idea of his size as pertaining to any job he seeks. As a result, he no longer wastes his time and efforts in madly chasing impossible jobs, but settles down to a determined and a frequently much more successful hunt for a job within his capabilities.

Incidentally, this is an ideal time to take some thought of the future and decide what one would like to be ten or twenty years from now, thus gaining an idea of how far one has progressed along the desired path, and what steps must still be taken to attain the goal. One should set up a high standard, but not an impossible one; and what that may be, each man must determine for himself. This mode of procedure enables a man to make a progressive effort to gain a job which is within reason and which will enable him to gain additional valuable experience. He has now reached the point of knowing what he wants, why he wants it, and why he should have it. A man in possession of these facts is a hard individual to turn down, and what is more important, he has acquired confidence.

Logically, the next step is to find a market for the goods. This is where the Bureau, advertisements, letters, and personal tips should be used. Bear in mind these are media only, and none of them will or can get the job itself, they merely place one in touch with it. Most jobs, and particularly the good ones, are "By Letter", so it behooves the applicant to give heed to what constitutes a successful letter.

Avoid wasting a paragraph or even a sentence telling how the job was located—the heading does that. Set forth the qualifications in general, but forceful, terms—the experience record will give the details and proof. Above all, be concise, for if you really know you will fill the job, your letter will show it. No man, not a genius, can dash off an effective letter in an hour. A successful letter is well worth several hours of effort. Even after composing what appears to be a good letter, its value must be tested in the open market—and the first attempt is rarely successful. Persistence plus knowledge and confidence must inevitably win.

Finally comes the interview. Its success will be dependent on the personal impression, an intelligent expression of requirements and qualifications, and mutually satisfactory terms. Physical appearance counts for a great deal.

Some are naturally gifted, others are not. One's natural inclinations usually tend toward work with which his physical appearance accords. One does not pick a dray horse for the race track. Therefore, look to the neatness of clothes, face, and shoes and let the guest beware of his manners. Watch carefully the questions and answers, as the tongue has often slipped many a man out of a good job. Lastly, endeavor to be reasonable in one's demands, for if the employer does not use good business judgment in dealing with the employee, the latter will not long have a job. The following summary will probably be more effective than the foregoing remarks. In any event, it is hoped that either or both will make a few of the job hunters think.

Hints on Job Getting

1.—Decide on what you want.

2.—Make sure your qualifications give you an even chance of getting it. Do not think 100% is necessary. Perfection does not exist.

3.—Do not go after a job unless you mean business.

4.—There are three factors to every job, *viz.*, advancement, experience, salary. Do not ignore the first two.

5.—Remember that the job gets the salary, not the applicant's qualifications.

6.—Job getting is selling one's services. The successful salesman knows his product thoroughly. Study your goods.

Letter Writing

1.—The object of a letter is to get an interview. Letters do not get jobs.

2.—Padding of payrolls is a felony. Padding of letters is equally dangerous for the job hunter.

3.—A letter must: Arouse interest; create desire; prove the case; and convince the reader that an interview will be profitable. Therefore: Be as brief as is consistent to prove your claims. Make no claims not backed by the experience record. Always include the experience record.

4.—Attractive packages improve the sale of goods. Therefore, typewritten letters on plain business stationery are better than long-hand letters on club or personal stationery.

Interviews

The interview is "the day in Court". Getting it is only one-half the battle. When being interviewed:

1.—Be confident of your worth, but not presumptious.

2.—Be sure you want the job and be ready to prove why you should get it.

3.—Ask a fair market price for your goods. Do not profiteer. Do not be a philanthropist.

4.—Assay the three elements: Advancement, Training, Salary, and be guided by the sum of the three in accepting or declining.

5.—Leave in a pleasant, hopeful manner if the job is not decided then and there.

6.—A letter of acknowledgment of the courtesy of an interview is good policy following a promising call.

Finally, maintain the proper mental attitude. Do not let your morale slump. No one wants a grouch or a man who is not sure of himself.

Report of Standing Committee of the Vitrified Paving Brick Conference

On November 15th, 1921, the general Conference on Paving Brick eliminated fifty-five out of the sixty-six varieties of paving brick,* and at the same time appointed a Standing Committee to consider further elimination in this field. This Standing Committee met on March 27th, 1922, and eliminated four additional types, leaving the following as recognized sizes and varieties of paving brick:

Variety.	Width, in inches.	Depth, in inches.	Length, in inches.
Plain wire-cut brick (vertical fiber lugless)	3	4	8½
	3½	4	8½
Repressed lug brick	3½	4	8½
	3½	3	8½
Wire-cut lug brick (Dunn)	3½	3½	8½
	3½	4	8½
Hillside lug brick (repressed)	3½	4	8½

Appointment of Former Enlisted Men as Officers of the Reserve Corps

It is well known that, during the early months of this country's participation in the World War, engineers and others of education, ability, and experience, waived the opportunity of obtaining commissions and enlisted in the Engineer Regiments that were being recruited for immediate service in France. Thus, it happened that in many of these regiments, a large proportion of the rank and file were graduates of colleges or technical schools, with all the qualifications requisite for Engineer Officers.

In the event of a future emergency, such men, by reason of their professional accomplishments, combined with their military experience, would be of inestimable value as Engineer Officers. Although it is true that even though these men may not now enroll in the Reserve Corps, they would come forward in time of need, and their value would be greatly enhanced should they accept commissions now, for by this means they would keep in touch with military developments.

The present project for six volunteer field armies for the National Defense calls for an ultimate strength of 9 000 Engineer Officers. The present total, including Regular Army, National Guard, and Organized Reserve, is less than 4 000. It is the policy of the War Department to enroll in the Engineer Section of the Officers' Reserve Corps those who served as enlisted men during the World War, provided they have the technical qualifications to warrant such appointment. They will be appointed in grades commensurate with their positions and responsibilities in civil life. Men of this type can be enrolled in the higher grades without affecting in any degree the appointment as Second Lieutenants of the young and inexperienced graduates of the Reserve Officers' Training Corps units of the Universities.

* *Proceedings*, Am. Soc. C. E., December, 1921, p. 950.

In considering applications of enlisted men for commissions in the Engineer Reserve Corps, examining boards will exercise a wide discretion and will give great weight to professional and technical ability rather than a detailed knowledge of military regulations. Candidates for appointment will be expected to demonstrate by their past achievements and present worth that they have the capacity to adapt themselves to the military system should occasion arise, but they will not be rejected because of present unfamiliarity with military subjects alone. Officers so appointed will be given an opportunity to receive the necessary instruction in military subjects before they are called on for actual service in their grades or before they are eligible for promotion to the next higher grade.

Detailed information may be had by writing to the Chief of Engineers, Washington, D. C., or to the Corps Engineer at the headquarters of any of the nine Corps Areas into which the country is divided.

ACTIVITIES OF LOCAL SECTIONS*

Meeting of Buffalo Section

A meeting of the Buffalo Section was held on April 4th, 1922, at the Old Colony Club, Buffalo, N. Y.; President A. L. Johnson in the chair; and Bruce L. Cushing, Secretary.

The address of the evening was made by Dr. Julian Park, Dean of the University of Buffalo, whose subject was "Education". In the course of his address, Dr. Park paid particular attention to the past, present, and future subjects taught in the University of Buffalo. He outlined the growth of the University since its organization in 1846, stating that the first engineering classes were started in 1921 and asking the co-operation and assistance of local engineers in this work.

The following officers of the Section were elected for the ensuing year: President, Walter McCulloh; Vice-President, Elwin G. Speyer; and Secretary-Treasurer, John H. Feigel.

Meetings of Cleveland Section

A meeting of the Cleveland Section was held at the Hotel Winton on February 8th, 1922; President A. V. Ruggles in the chair; George H. Tinker, Secretary; and present, also, 15 members.

The address of the evening was made by Professor Sherman, of the Ohio State University, who discussed the "Proposed Cross-State Canal".

Meeting of February 22d, 1922

A called meeting of the Section was held at the Hotel Winton on February 22d, 1922, to meet Acting Secretary Elbert M. Chandler of the Society; President A. V. Ruggles presided at the meeting; George H. Tinker, Secretary.

Acting Secretary Chandler addressed the meeting on the April meeting of the Society to be held in Dayton, Ohio, and also on the Society Budget for 1922.

On motion, duly seconded, the Secretary was directed to arrange a conference with representatives of the other Ohio Sections during the meeting at Dayton.

Meeting of March 8th, 1922

A meeting of the Section was called to order at the Hotel Winton on March 8th, 1922; President A. V. Ruggles in the chair; George H. Tinker, Secretary; and present, also, 42 members and guests.

The minutes of the meetings of February 8th and February 22d, 1922, were read and approved.

The Secretary presented several communications from Acting Secretary Elbert M. Chandler.

On motion, duly seconded, a letter-ballot of the Section was ordered taken on the question of the advisability of the Society joining the Federated American Engineering Societies.

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* For list of Local Sections, Officers, etc., see p. 430.

The question of the advisability of publishing sections of the catalog of the Engineering Societies Library in *Proceedings,* was discussed, and it was the consensus of opinion that such publication would be a useless expense.

After announcements in regard to the Society meeting at Dayton, Ohio, the meeting was addressed by Mr. W. H. Dittoe, Chief Engineer, State Board of Health, on the "Pollution of Lake Erie." This paper was followed by a general discussion by those present.

Meeting of April 12th, 1922

A meeting of the Section was held at the Hotel Winton on April 12th, 1922; Past-President J. E. A. Moore in the chair; George H. Tinker, Secretary; and present, also, 10 members.

The minutes of the meeting of March 8th, 1922, were read and approved.

The Secretary presented a communication from the Acting President of the Carnegie Institute of Technology in reference to the Second Conference on Engineering Education, and on motion, duly seconded, the Secretary was instructed to find a delegate for this Conference.

A communication from Acting Secretary Chandler in reference to a set of *Transactions* of the Society, and the appointment of a representative of the Section on the Sub-Committee on Power of the Committee on Publications, was presented. On motion, duly seconded, it was decided that the Section would not ask for a set of *Transactions,* and Mr. J. H. Tufel was recommended to represent the Section on the Sub-Committee on Power.

The Secretary reported the result of the Conference of Section Delegates at the Dayton meeting of the Society on April 6th, 1922.

On motion, duly seconded, it was decided that the order of business for the May meeting of the Section should be the Report of the River and Harbor Committee.

Meeting of Colorado Section

The 123d regular meeting of the Colorado Section was held at the Metropole Hotel, Denver, Colo., on March 27th, 1922; President A. N. Miller in the chair; Thomas H. Olds, Secretary; and present, also, 10 members and 2 guests.

The minutes of the previous meeting were read and approved.

The Secretary announced the resignation of Mr. H. L. Thackwell as a member of the Section, which, on motion, duly seconded, was accepted.

Relative to the grouping of the membership of the Society in District No. 11 by which a large proportion of the membership of the District is in the extreme southwest corner of the area, on motion, duly seconded, a resolution* was adopted, protesting against this grouping, and the Secretary was instructed to mail a copy of this resolution to the Society.

Mr. Julian Hinds, of the U. S. Reclamation Service, addressed the meeting on the subject "Some Experiences in the Operation of High-Pressure Reservoir Outlets". He described the installations for the Roosevelt, Path-

* See p. 385.

finder, Shoshone, and Strawberry Valley Dams, the difficulties in their operation, and the steps taken to remedy the defects.

Meetings of Connecticut Section

A meeting of the Connecticut Section was held at the Hotel Bond, Hartford, Conn., on March 7th, 1922; President W. J. Backes in the chair; C. M. Blair, Secretary; and present, also, 14 members.

On motion, duly seconded, it was decided to accept the invitation of the Hartford Branch of the Connecticut Section of the Mechanical Engineers to a joint meeting at Hartford on April 11th, 1922.

The subject "Traffic and Transportation Problems" was considered and discussed.

Meeting of March 25th, 1922

A meeting of the Connecticut Section was called to order at the Graduates' Club, New Haven, Conn., on March 25th, 1922; President W. J. Backes in the chair; C. M. Blair, Secretary; and present, also, 22 members and 2 guests.

The purpose of the meeting was to consider and take action on the matter of the Society joining the Federated American Engineering Societies. Professor C. F. Scott, of Yale University, and a Director of the Federated American Engineering Societies, who was present as a guest, addressed the meeting and explained the purposes and activities of the Federation. Director F. E. Winsor, who was also a guest at the meeting, presented reasons for and against joining the Federation.

A motion that "it is the sense of the Connecticut Section of the American Society of Civil Engineers that the American Society of Civil Engineers should join the Federated American Engineering Societies", was made and duly seconded. An amendment to the effect that the date of joining should be at the end of the present fiscal year of the Society, was offered and incorporated in the original motion. The vote on this motion resulted in 7 for and 15 against the resolution.

A report was presented by the delegates to a preliminary conference in regard to a proposed affiliation of the Engineering Societies of Connecticut, recommending that the Section should not join this affiliation. On motion, duly seconded, the report of the delegates was accepted and the recommendation adopted.

Meeting of Duluth Section

A meeting of the Duluth Section was held on April 17th, 1922; President John L. Pickles in the chair; Walter G. Zimmermann, Secretary; and present, also, 21 members and 1 guest.

The President introduced the guest of the evening, Mr. R. W. Acton, Engineer of Roads for St. Louis County, Minn.

The minutes of the meeting of the Section of March 20th, 1922, were read and approved.

The Secretary presented a letter from Acting Secretary Chandler asking the Section to suggest a member to act as representative on the proposed Sub-Committee on Power of the Committee on Publications. The Board of

Directors of the Section presented the name of Mr. Francis A. Cokefair, and the Secretary was instructed to advise Mr. Chandler of that fact.

The meeting having been turned over to the Entertainment Committee, the Chairman of that Committee, Mr. O. H. Dickerson, presented Maj. E. H. Marks, who spoke on "The Standardization of Map Scales". The subject was discussed by those present, but as it was too large to be concluded at this meeting, a motion was made, seconded, and carried, that a committee be appointed to study the subject and bring in a report with recommendations at the next meeting of the Section. President Pickles subsequently appointed Maj. Marks, Chairman, and Messrs. Christie, Darling, Hutchinson, Lawrie, and Reed as such Committee.

President Pickles called attention to the fact that the next meeting would be the Annual Meeting of the Section for the election of officers and requested that the members make it a point to be present and suggest the names of members for officers for the next year.

President Pickles stated that, at the present time, the Section consists of 36 active members (32 resident in Duluth and 4 non-resident members), that three applications have been sent in to Society Headquarters, and that there were five other prospective members who are considering making applications for membership.

Meetings of Los Angeles Section

The meeting of the Los Angeles Section was held on February 8th, 1922, at the City Club; President Ralph J. Reed in the chair; F. G. Dessery, Secretary; and present, also, 38 members and 10 guests.

President Reed introduced the speaker of the evening, Mr. Franklin D. Howell, Consulting Engineer and General Manager of the Motor Transit Company, who addressed the meeting on "Motor Stage Transportation and Some of the Problems Encountered in the Operation Thereof". The subject was discussed by Messrs. Dennis, La Rue, Hill, Wheeler, Bennett, Thomas, Code, Reed, Barnard, Bowen, Cory, Rowe, Comber, and Anderson. At the conclusion of the discussion, President Reed, on behalf of the Section, thanked Mr. Howell for his instructive address.

On motion, duly seconded, the minutes of the previous meeting were approved as written.

The election of Messrs. F. W. Blackford, H. T. Cory, C. Robert Adams, and O. A. Stone as members of the Section was announced. President Reed announced the resignations of Messrs. Ward Hall, H. A. Larsen, and L. R. Walker as members of the Section.

A letter of February 6th, 1922, from W. T. Knowlton, Engineer of Sewers, in which he pointed out the urgency of a permanent sewage disposal system for Los Angeles, was referred to the Sewer Committee with instructions to consult with the City Engineer if necessary.

Director George G. Anderson presented a brief résumé of the January meeting of the Board of Direction of the Society. He favored the Society joining the Federated American Engineering Societies, the recataloging of the Engineering Societies Library, and the proposed amendments to the Constitution.

On motion, duly seconded, it was unanimously decided that it was the sense of the meeting that the Society become a member of the Federated American Engineering Societies.

A motion to the effect that additional sections of the catalog of the Engineering Societies Library be published in *Proceedings* from time to time, having been duly seconded, was adopted.

President Reed announced the death of Karl D. Schwendener, M. Am. Soc. C. E., a member of the Section, and appointed Messrs. J. E. Rockhold and Blaine Noice to prepare resolutions and a memoir.

Meeting of March 8th, 1922.

A meeting of the Los Angeles Section was held on March 8th, 1922, at the City Club; President Ralph J. Reed in the chair; F. G. Dessery, Secretary; and present, also, 40 members and 16 guests.

President Reed announced the death of Edgar True Wheeler, M. Am. Soc. C. E., on March 2d, 1922, and on motion, duly seconded, appointed Messrs. F. G. Dessery, H. Hawgood, and P. B. Harris as a committee to draft resolutions on the death of Capt. Wheeler.

The subject for discussion at the meeting, "The Conservation of the Water Resources of California", was announced by President Reed who also introduced the guests of the Section, J. C. Forkner, Chairman of the Consulting Board of the State Water Commission, and Messrs. Bailey, Etcheverry, Marshall, McGlashan, and Attorney-General U. S. Webb of California, all members of the Consulting Board, and Mr. F. C. Scobey, Engineer in Charge of Water Investigations.

During the discussion which followed, Chairman Forkner read the Legislative Act authorizing the appropriation for the study of water resources of the State and the formation of the Consulting Board. He was followed by Deputy State Engineer Bailey, who presented an outline of the accomplishments to date in the collection of data. A general discussion of the subject was then participated in by Messrs. Hill, Lippincott, Mulholland, Howell, Anderson, Morris, and Sonderegger, and also by City Attorney Jess E. Stephens as representative of the Bar Association, and Attorney-General Webb, both of whom discussed the legal phases of water conservation.

Mr. F. L. Sellew, Chairman of the Standing Committee on Sewerage, presented the report of this Committee, to which the communication of Mr. W. T. Knowlton regarding the sewerage situation of Los Angeles had been referred. The report was generally discussed and on motion, duly seconded, was approved and adopted. The Board of Directors, as a Committee, was instructed, on motion, duly seconded, to prepare and present to the City Council, Municipal League, Realty Board, Chamber of Commerce, and other interested parties, a summary of this report.

Meeting of April 12th, 1922

A meeting of the Los Angeles Section was held at the City Club on April 12th, 1922; President Ralph J. Reed in the chair; F. G. Dessery, Secretary; and present, also, 61 members and 36 guests.

A letter was presented from Director George G. Anderson in regard to the Dayton meeting of the Society.

President Reed announced that the 1922 Roster and Constitution of the Section would soon be ready for distribution.

A communication from the American Association of Engineers, inviting the Section to attend the meeting of that Association, was read by President Reed. This meeting is to be addressed by Professor Duff Abrams, M. Am. Soc. C. E., relative to the work he is doing on concrete at the Lewis Institute, Chicago, Ill.

Resolutions on the deaths of Karl DeWitt Schwendener, M. Am. Soc. C. E., and Edgar True Wheeler, M. Am. Soc. C. E., members of the Section, were, on motion, duly seconded, adopted.

President Reed introduced City Engineer J. A. Griffin, who spoke in detail on "The City's Serious Sewerage Situation". In the course of his remarks, Mr. Griffin outlined the various temporary methods proposed to handle the situation until permanent relief has been secured. The subject was discussed by Messrs. W. T. Knowlton, Engineer of Sewers, Barnard, Rowe, Hill, Sawyer, and Olmsted. President Ralph Criswell, of the City Council, spoke on the attitude of the City Council in the matter, and the subject was further discussed by Messrs. Binckley, Sellew, and Lippincott.

After his discussion, Mr. Lippincott made a motion to reconsider the report of the Standing Committee on Sewerage which was adopted by the Section at its meeting of March 8th, 1922. After discussion by Messrs. Hawgood, Jubb, Knowlton, Griffin, Smith, Lippincott, Trask, Binckley, Criswell, Sellew, Dennis, Patch and Kerr, President Reed called for a vote on the motion for a reconsideration of the report of the Committee on Sewerage, which motion was duly carried.

On motion, duly seconded, the Section, on reconsideration of this report, adopted the report in full with the exception of the Committee's suggestion that pumps be installed in the outfall sewer.

The following resolution was, on motion, duly seconded, adopted:

"This Section realizing the urgency of the entire sewerage situation and lack of understanding by the citizens of Los Angeles authorize the President to appoint a committee of seven, to be known as a 'Committee on Publicity', to aid the campaign in favor of an outfall sewer."

President Reed subsequently appointed Messrs. Sellew, Adams, Barnard, Bowen, Howell, Olmsted, and Dessery as such Committee.

Meeting of Louisiana Section

A regular meeting of the Louisiana Section was held on April 12th, 1922, at the residence of the President in New Orleans, La.; President Ole K. Olsen in the chair; F. A. Muth, Secretary; and present, also, 16 members and guests.

The minutes of the previous meeting were read and approved.

The following officers were elected for the ensuing year: President, Donald Derickson; and Second Vice-President, Samuel M. Young. The following

officers are hold-overs, their term of office being for two years: First Vice-President, E. H. Coleman; Treasurer, C. N. Bott; and Secretary, F. A. Muth.

The meeting was followed by a delightful supper and smoker.

New York Section in Joint Meeting on Muscle Shoals Project

The fourth Joint Meeting of the Metropolitan Sections of the four Founder Societies was held in the Auditorium of the Engineering Societies Building on April 14th, 1922, with W. S. Finlay, Jr., Chairman of the Metropolitan Section, American Society of Mechanical Engineers, in the chair, and about 800 members and guests present. The programme had been arranged by the Ordnance Division of the American Society of Mechanical Engineers on the subject, "Muscle Shoals as a Power and Nitrates Producer", to be presented in two phases: First, from the standpoint of power production; and, second, from that of nitrates production both for commercial and munitions purposes.

Before the speakers on the main phases of the topic were introduced, the Chairman presented Mr. Theodore Nagel, Consulting Engineer, who explained the chemical processes in the production of ammonium nitrate, and moving pictures showing the various details of the Muscle Shoals plant were exhibited.

Brig.-Gen. Harry Taylor, Assistant Chief of Engineers, U. S. A., discussed the project as a power producer, illustrating his address by lantern slides. Mr. W. S. Landis, Chief Technologist of the American Cyanamid Company, discussed the commercial uses of the plant, and Maj.-Gen. C. C. Williams, Chief of Ordnance, U. S. A., presented the general subject of fixed nitrogen as a raw material of war, and its importance in the manufacture of munitions, and included a description of various Government nitrate plants. Mr. F. E. Frothingham, of Coffin and Burr, Bankers, presented the bankers' point of view, and compared the offers made by the Alabama Power Company and by Mr. Henry Ford. Mr. E. A. Yates, of Wood, Hulse and Yates Company, Engineers, made a plea to have the power distributed to the adjoining territory for general industrial purposes.

Nominating Committee Elected at Business Meeting

At a regular business meeting of the New York Section held at 7:30 P. M., preceding the Joint Meeting, President Nelson P. Lewis in the chair, J. P. J. Williams, Secretary, and about 25 members present, the following were unanimously elected to serve on the Nominating Committee to present the names of officers to be elected at the Annual Meeting of the Section in May; Messrs. J. B. French, George L. Lucas, James H. Edwards, Clifford Holland, and Thaddeus Merriman.

A letter was read inviting the Section to appoint one representative to serve on the Committee on City Departments, which is composed of delegates from the New York Chapter of the American Institute of Architects, the Building Trades Employers Association, the New York Board of Fire Underwriters, the American Institute of Consulting Engineers, the Brooklyn Chapter of the American Institute of Architects, the New York Society of Architects, and the Iron League of New York. After parts of the Constitution under which the Committee functions, were considered, it was moved, seconded, and carried, that the invitation be referred to the Board of Directors, with power.

Second Sub-Section Conference on Design

At 5:15 P. M., preceding the foregoing meetings, the second of the series of three Sub-Section Conferences was held, Mr. James H. Edwards, Assistant Chief Engineer of the American Bridge Company, presiding, and about 35 members present. The subject "Structural Design and Details—the Responsibility of the Engineer" was discussed with general interest, resulting in a motion, duly seconded and carried, directing the Chairman to appoint a committee of three, including himself, to present to the next meeting of the Sub-Section a form of resolution suitable to bring before the Section to obtain action toward a revision of laws or building codes of the United States, in order to provide more effective safeguards to the public in the methods of control over the design and construction of places of public assembly. The Chairman subsequently appointed Messrs. J. B. French and Eugene W. Stern to serve with him on this Committee.

Joint Meeting of the Northeastern Section and Boston Society of Civil Engineers

A joint meeting of the Northeastern Section and the Boston Society of Civil Engineers was held on April 26th, 1922, in Gilbert Hall, Tremont Temple, Boston, Mass.; Chairman Frank B. Sanborn presiding; Charles W. Banks, Secretary; and present about 75 members of both Societies and guests.

The object of this meeting was to discuss "Universal Form of Contract", and this subject was presented by representatives of the engineering, architectural, and contracting professions, including Gen. William H. Rose, and Messrs. William Stanley Parker, Arthur W. Dean, J. Parker Snow, Frank M. Gunby, and Arthur C. Tozzer. The addresses were followed by discussion from the floor by Professors C. Frank Allen and Charles M. Spofford, and Messrs. Wason, Larned, Nelson, and others. The opinion of the majority of the speakers seemed to be that the "Universal Form of Contract" when it could be prepared acceptably to the different interests concerned, would be very desirable and would accomplish much.

Meeting of Northwestern Section

A meeting of the Northwestern Section was held at the Minneapolis Athletic Club, Minneapolis, Minn., on March 31st, 1922; President W. T. Walker in the chair; Bernard Blum, acting as Secretary; and present, also, 19 members.

After discussing local Society matters, President Walker called attention to the fact that dues had not been collected and the Minnesota Federation of Engineers was calling for the payment of the tax of Section members. On motion, duly seconded, the President and officers of the Section were authorized and requested to serve notices and collect dues and also the amount due to the Minnesota Federation.

President Walker left the meeting and Vice-President Herrold took the chair.

The report of Mr. P. E. Thair, delegate of the Section to the meeting of District No. 7, held in Chicago, Ill., on March 17th, 1922, was read, and on motion, duly seconded, the report was received and placed on file.

The question of the Society joining the Federated American Engineering Societies was discussed, and on motion, duly seconded, the meeting endorsed the plan of the Society joining the Federation, and the Secretary was instructed to request the Society to send out a letter-ballot on the question.

A motion that the Section express itself as in favor of holding a Zone Meeting annually was duly seconded and carried.

On motion, duly seconded, the Chairman was instructed to appoint a representative of the Section to attend the meeting of the Society at Dayton, Ohio, and report back to the Section. The Chairman subsequently appointed President Walker as such representative.

On motion, duly seconded, the Secretary was instructed to notify Mr. Anson Marston, Chairman of the Conference Committee of District No. 7, of the action taken by the meeting on the recommendations of the meeting in Chicago on March 17th, 1922.

On motion, duly seconded, the Chairman was authorized to appoint a committee of three to investigate the question of a paid Secretary for the Section and report back at the next meeting. Mr. Herrold subsequently appointed Messrs. Clements, Wilson, and Hutchinson as such Committee.

Meetings of Philadelphia Section

A joint meeting of the Philadelphia Section was held at the Engineers' Club on March 6th, 1922, with the Engineers' Club, the Society of Municipal Engineers, and several National Engineering Societies; President Benjamin Franklin in the chair; Lewis R. Ferguson, Acting Secretary; and present, also, 120 members and guests.

The subject for discussion, "Zoning and Its Relation to City Development", was opened by Mr. Lawson Purdy, of New York City, who described the development of zoning in New York City and the benefits derived from its application. Mr. Purdy was followed by Mr. B. A. Haldeman, of the Pennsylvania State Bureau of Municipalities, who discussed the subject from the standpoint of its value in promoting orderly growth. Mr. M. B. Medary, Jr., a member of the Philadelphia Zoning Commission, discussed the general features of the zoning ordinance now being prepared for that city, illustrating his remarks with lantern slides.

Meeting of March 21st, 1922

The Philadelphia Section participated in a symposium on Hydro-Electric Development which was held on March 21st, 1922, by the Engineers' Club of Philadelphia and other Sections of the National Engineering Societies.

The Section was represented at these meetings by N. C. Grover, Chief Hydraulic Engineer of the U. S. Geological Survey, who discussed the subject "The Relations of Water Resources to the Country's Development".

Meeting of April 3d, 1922

A regular meeting of the Section was held at the Engineers' Club on April 3d, 1922; President Benjamin Franklin in the chair; Lewis R. Ferguson, Acting Secretary; and present, also, 43 members and guests.

On motion, duly seconded, the proposed revision of the Constitution and By-Laws of the Section was approved and ordered sent to letter-ballot.

On motion, duly seconded, a resolution was adopted unanimously re-affirming the former position of the Section that the Society should join the Federated American Engineering Societies as soon as its finances permit.

The meeting was devoted to an explanation of the work of the Committee of the Engineers' Club in evaluating the desirability of the several sites proposed for the Sesqui-Centennial in 1926, which was done at the request of the Executive Committee of the Sesqui-Centennial Association. Mr. W. P. Parker, who was Chairman of the Co-ordinating Committee, described the basis on which the evaluation was made, and his explanation was supplemented by remarks by Mr. J. A. Vogleson and others.

Meeting of May 1st, 1922

A meeting of the Philadelphia Section was held on May 1st, 1922; President Benjamin Franklin in the chair; Lewis R. Ferguson, Acting Secretary; and present, also, 135 members and guests.

After a short business session, the meeting was addressed by John R. Freeman, President, Am. Soc. C. E., on "Some Engineering and Industrial Problems in China and the Far East", the address being illustrated with lantern slides.

Preceding the meeting, a dinner was given by the Section in honor of President Freeman, which was attended by many of the most eminent engineers of the city.

Activities of San Diego Section

On January 28th, 1922, members of the Section were invited to inspect the works under construction by the U. S. Navy Department in San Diego. Among the various units inspected were the Naval Training Station and Marine Barracks, the former being under construction and the latter recently completed, the hospital in Balboa Park, which is nearing completion, and the Repair Base on the site of the former concrete shipyard of the Emergency Fleet Corporation. The party was conducted by Lieut. H. G. Lehrbach, of the Naval Public Works Office, who described the principal features of the works visited.

The program for the meeting on February 21st, 1922, was a discussion of the Progress Report of the Joint Committee on Tentative Specifications for Concrete and Reinforced Concrete. The discussion was opened by Messrs. J. T. Vawter and R. W. Whitaker, and was participated in by the members present.

Through the courtesy of Mr. H. N. Savage, Hydraulic Engineer of the City of San Diego, the members of the Section were invited to visit Barrett

Dam on March 12th, 1922. Those taking the trip were guests of Mr. Savage at a dinner which was followed by an inspection of the work on this structure now nearing completion.

The meeting of the Section of March 18th, 1922, was a dinner meeting, with Director George G. Anderson as the guest of honor. The business meeting which followed, was devoted to discussion of Society matters of general interest to the Local Sections, regarding which Mr. Anderson furnished much information to the members present.

Mr. F. J. Grumm has tendered his resignation as President of the Section, on account of his removal to Sacramento, Calif., and the office has been filled by the appointment thereto of Mr. P. R. Watson, Vice-President of the Section.

Meeting of San Francisco Section

A regular meeting of the San Francisco Section was held at the Engineers' Club on February 20th, 1922; President Thomas H. Means in the chair; Henry D. Dewell, Secretary; and present, also, 86 members and guests.

President Means announced that the Section had been honored by having two of its members awarded prizes by the Society for papers presented during the year, and that Messrs. Fred A. Noetzli who had received the J. James R. Croes Medal, and L. Standish Hall who had been awarded the Collingwood Prize, were the guests of the Section at the meeting.

The Secretary announced the appointment, by President Means, of members of the Excursion Committee, the Publicity Committee, and the Committee on Society Welfare for 1922.

Director W. L. Huber and Vice-President C. E. Grunsky reported on the proceedings of the Annual Meeting of the Society in New York City. It was announced in this report that the Board of Direction had adopted the plan of holding professional meetings in the Spring and Fall in different parts of the country, the first meeting to be held in Dayton, Ohio, in April, and the second in San Francisco in October, 1922.

Mr. E. T. Thurston addressed the meeting on the work of the Joint Conference of Engineers, Architects, and Constructors which was held in Washington, D. C., in December, 1921, for the purpose of producing a standard form of contract agreement for all sections of the United States and for all phases of industry. It was suggested that as the laws and customs of different sections of the country might require special consideration with regard to contract forms, that the various points of view might be obtained through the Local Sections. On motion, duly seconded, a resolution was adopted embodying this suggestion, and the Secretary was instructed to request the Society to supply all Local Sections with a complete draft of the proposed contract form and to invite comment thereon.

A letter was presented from Acting Secretary Chandler relative to the allocation to Local Sections of a part of the dues of their members, and it was stated that the Secretary had forwarded a membership list of the Section, showing 232 members to the Headquarters of the Society.

The Secretary presented a letter from Acting Secretary Chandler relative to the resolution passed by the Board of Direction directing him to communicate with all Local Sections that the Board would, at its April meeting, consider the question of the Society becoming a member of the Federated American Engineering Societies, and to ascertain the sentiment of the members of the Section on the subject.

In this connection a letter was presented by the Secretary from Past-President Muhs urging that the Section decline to join the Federation on account of financial and other reasons. Mr. W. L. Huber also read a personal letter from Mr. Robert Ridgway of New York City, who advanced the same arguments made by Mr. Muhs and who also reported that a meeting of the New York Section had voted unfavorably on this matter. Mr. Grunsky spoke in favor of the Society joining the Federation and moved that a post-card vote of the Section be taken on the subject, which motion was seconded. After amendments to this motion had been made and carried, and the subject had been discussed by Messrs. Muhs, Rhodin, Thurston, Tibbetts, and Galloway, a vote on the original motion resulted in a tie.

It was then moved and seconded that the meeting vote on whether or not it was in favor of a National organization of engineering societies. After some discussion, it was decided, by rising vote, that the meeting was not in favor of a National organization of engineering societies.

The subject of the meeting was presented by Mr. William Cushing Edes, who presented "A Little Talk on Alaska by a Civilian Engineer Engaged in Government Work". In the course of his address, Mr. Edes presented briefly a history of the Government railroad work in Alaska under the Alaskan Engineering Commission, and illustrated his remarks with slides showing typical Alaskan scenery, agricultural, and natural products, and scenes of construction along the railroad.

Excursion to Sacramento

On March 24th, 1922, twenty-four members of the Section left on the boat of the California Transportation Company for Sacramento, Calif., where they were met by representatives of the City and by the Sacramento members of the Society, and transported by automobiles to the City Pumping Plant and, later, to the yard of the Valley Pipe Company. The party made a tour of inspection of the Pumping Plant, under the direction of Professor C. G. Hyde and his associates, and the work being done there was explained by model and plans. Photographs showing the progress of the work since the beginning were also exhibited.

The yard of the Valley Pipe Company was next visited where the party was invited to witness tests of concrete pipe. These tests consisted of breaking concrete sewer culvert pipe of different diameters and different thicknesses, both reinforced and unreinforced. There were also tests by water pressure applied to the interior and exterior of the pipes. The pipe tests were witnessed by about 45 members.

After luncheon at the Hotel Land in Sacramento, the party attended the ceremony in connection with the commencement of work on the new State Building.

Meetings of Seattle Section

A meeting of the Seattle Section was held at the Engineers' Club on March 27th, 1922, at 8 P. M.; President F. F. Sinks in the chair; Frank H. Fowler, Secretary; and present, also, 30 members.

The minutes of the previous meeting were read and approved.

The revised Constitution of the Society relative to the election of officers was outlined by Mr. Joseph Jacobs.

Messrs. A. S. Downey and S. H. Hedges reported on the Association of General Contractors of America and explained its activities.

Mr. T. E. Phipps, for the Legislative Committee, reported on the discussion at the meeting of the Advisory Committee in regard to the activities of the Committee.

The work of the Membership Committee was discussed by Mr. T. R. Beeman.

A suggestion by Mr. Phipps that members from out of town be asked to pay only a nominal amount of dues was referred to the Membership Committee.

The three-cent fare bill was discussed by Mr. Shields, and the subject of taxation and utilities was discussed by Messrs. Dimock, Hedges, Holmes, Hall, and Phipps. During this discussion, the suggestion was made that the Section investigate the basis of taxation in Seattle and other coast cities, and the duty of members of the Society in relation to the consideration of public questions was also discussed.

A motion that the Section at its March meeting discuss and declare itself unanimously against the Erickson Bill was referred to the Legislative Committee.

Mr. Harding, Secretary of the General Contractors' Association, addressed the meeting on the objects and aims of that organization.

Meeting of April 24th, 1922

A regular meeting of the Seattle Section was held at the Engineers' Club on April 24th, 1922; President F. F. Sinks in the chair; Frank E. Fowler, Secretary; and present, also, 15 members.

The minutes of the meeting of March 27th, 1922, were read and approved.

A letter from William G. Atwood, M. Am. Soc. C. E., Director, Marine Piling Investigations, of the National Research Council, outlining a proposed marine piling investigation to be held in Seattle, was referred to Mr. R. J. Middleton and his committee for report and suggestions.

A letter from the San Francisco Section requesting the co-operation of the Section in the matter of the Fall meeting of the Society to be held in San Francisco, was referred to the Entertainment Committee for action.

The Secretary presented a letter from Acting Secretary Chandler requesting advice regarding the shipment of volumes of *Transactions* to the Section. On motion, duly seconded, the Secretary was instructed to advise Mr. Chandler to ship the available volumes unbound.

The Report of the Parent Relationship Committee regarding the advisability of the Society joining the Federated American Engineering Societies was read, and approved, and on motion, duly seconded, the Secretary was instructed to transmit copies of the report to the Society and to the Duluth Section. In this report, the Committee favored the Society joining the Federated American Engineering Societies as soon as its financial condition would permit.

Mr. T. E. Phipps presented a report on the bill which is to come up at the May election of the City of Seattle regarding the abolishment of the Department of Public Utilities. The subject was discussed at length, and on motion, duly seconded, it was resolved that the Section disapprove of the abolishment of the Department of Public Utilities and of the creation of a Department of Transportation.

Maj. C. H. Reeves discussed in detail the workings of the Department of Public Utilities, and on motion, duly seconded, the publicity to be given the action taken by the Section on this matter and on the Section's decision on the so-called three-cent car fare bill was referred to the Legislative Committee for immediate action.

The address of the evening was presented by Maj. Jesse A. Jackson on "Some Aspects of City Zoning Applied to Seattle", and illustrated by maps and slides. At the conclusion of the address, a vote of thanks was tendered Maj. Jackson.

Special Meeting of Spokane Section

A special meeting of the Spokane Section was held on March 30th, 1922, at the East Banquet Annex, Davenport's; President C. A. Burnette in the chair; Charles E. Davis, Secretary; and present, also, 12 members.

A communication from the Seattle Section regarding territorial boundaries of the Seattle and Spokane Sections was read, the 120th Meridian being suggested as such boundary. The Columbia River and the west line of Okanogan County were suggested by the Section as being the more natural boundary line.

Annual Meeting of Utah Section

The Annual Meeting of the Utah Section was held at the University Club, Salt Lake City, Utah, on April 5th, 1922; President W. R. Armstrong in the chair; H. S. Kleinschmidt, Secretary; and present, also, 21 members and 4 guests.

The report of the Secretary-Treasurer was read, and on motion, duly seconded, accepted.

The following officers for 1922 were elected: President, B. W. Matteson; Vice-President, H. L. Baldwin; and Secretary-Treasurer, H. S. Kleinschmidt.

The Secretary presented a communication from the Society relative to volumes of *Transactions* available for Local Sections. As the Section has no permanent quarters, Mr. C. E. Painter offered to provide room for such *Transactions,* and on motion, duly seconded, his offer was accepted and the Secretary was directed to send for the volumes.

A letter from the Acting Secretary of the Society relative to the Sub-Committee on Power of the Committee on Publications, asking for suggestion as to a member from the Section for this Sub-Committee, was read. On motion, duly seconded, the President was authorized to make such appointment.

The meeting then adjourned to Barratt Hall, where a public meeting was held on "Reclamation", the attendance at which was about 400. The discussion was opened by Mr. E. C. LaRue, Hydraulic Engineer of the U. S. Geological Survey, who gave an interesting talk on the Colorado River, illustrating his remarks with colored lantern slides. He presented data as to available reservoir sites on that river and its tributaries, and as this subject is of interest to the people of Utah and adjoining States, a general discussion followed which was led by Mr. R. E. Caldwell, State Engineer.

The past, present, and prospective development of the Snake River in Idaho was discussed by Mr. F. A. Banks, Engineer of the U. S. Reclamation Service, at American Falls, Idaho, who also illustrated his talk with lantern slides.

Mr. William M. Greene, Engineer, U. S. Reclamation Service, at Salt Lake City, presented a brief address on the investigations now under way in Utah by the U. S. Reclamation Service, which is co-operating with the State of Utah through the Utah Water Storage Commission in this work.

President Matteson appointed Messrs. R. K. Brown and A. B. Villadsen as representatives of the Section on the Governing Board of the Utah Engineering Council, and Mr. LeR. M. Pharis as the member from the Section on the Sub-Committee on Power of the Committee on Publications of the Society.

EMPLOYMENT SERVICE OF THE FEDERATED AMERICAN ENGINEERING SOCIETIES

An Engineering Societies Service Bureau was established December 1st, 1918, as an activity of Engineering Council, managed by a board made up of the Secretaries of the four Founder Societies, funds for its maintenance being provided by these Societies. On January 1st, 1921, this Bureau was taken over by The Federated American Engineering Societies and is now known as the Employment Service of that organization. It is co-operating with engineering organizations in all parts of the country and is desirous of increasing such co-operation by working with local engineering associations and clubs. Members of the American Society of Civil Engineers who desire to register should apply for further information, registration forms, etc., to Walter V. Brown, Manager, Engineering Societies Building, 29 West 39th Street, New York City. In order to be included in the list published in *Proceedings*, copy must be received on or before the first Wednesday of each month. All communications should be addressed to Mr. Brown.

EMPLOYMENT BULLETIN

POSITIONS AVAILABLE

CIVIL ENGINEERS qualified to fill structural and architectural drafting positions will please apply at once to the Employment Service.

INSTRUCTORS: All engineers willing to consider teaching positions are invited to register with the Employment Service, which has been called on to fill positions varying in grade from laboratory assistant to heads of departments in various engineering and technical schools of the United States.

TWO COMPUTERS for sanitary work and for taking quantities from plans. Some designing will be required. Application by letter. Salary not stated. Location, New York City. V–901.

RESIDENT ENGINEER, energetic, live, and experienced for paper mill construction. Application by letter. Salary not stated. Location, Chicago, Ill. V–914.

THREE OR FOUR DRAFTSMEN familiar with general plant equipment, layout in connection with paper, pulp, and sulphite work. At least five years' experience. Salary in accordance with ability. Application by letter. Location, Chicago, Ill. V–915.

YOUNG CIVIL ENGINEER out of college about one year to do statistical work in office. Good future with a dependable firm. Application in person. Location, New York City. V–937.

TWO YOUNG CIVIL ENGINEERS for structural steel design on bridge work and inspection of existing bridges. Headquarters at Providence, R. I., and New Haven, Conn. Application by letter. V–974.

TWO YOUNG ENGINEERS to sell asbestos products of all kinds. Application in person. Salary not stated. Headquarters, New York City. V–995.

SALES ENGINEERS, chemical or mechanical. Several engineers to handle State territories on a liberal commission basis. Company manufactures an alloy combining unusual wearing qualities as a bearing metal, remarkable acid resistance, and great strength. Castings are made from 15 to 60 sclerescope, and from 75 000 to 100 000 lb. per sq. in. tensile strength. This metal has been on the market for eight years and is widely used by many nationally known concerns. An automobile valve, made of this alloy, is meeting with instant success wherever it has been introduced. The sales rights for this valve will be given along with other lines and will show a profit from the start. Application should state age, education, experience in detail, and choice of localities. A recent photograph is desirable. Headquarters, Wisconsin. V–1001.

SALES MANAGER for roofing department, to take care of office correspondence. Preferably one who knows New England territory and something of building construction and merchandising. Application in person. Salary not stated. Location, Boston, Mass. Headquarters, New York City. V–1007.

ENGINEER with thorough knowledge of passenger traffic routing on railroads. Application in person. Salary not stated. Location, New York City. V–1013.

BUILDING SUPERINTENDENT thoroughly experienced in building work, handling contractors, etc. Application by letter. Salary not stated. Location, Pennsylvania. V–1019.

DESIGNER AND DRAFTSMAN for structural steel building. Several months' work. Application by letter, stating experience and whether willing to go to Detroit. Salary not stated. Location, Detroit, Mich. V–1020.

SALESMEN to sell Ready Cut Homes direct from manufacturer. Men traveling in New England, West, and Middle Atlantic States.

May be used as side line. Liberal commission. Write for appointment. Location, Seattle, Wash. V–1021.

EXPERIENCED BRIDGE DESIGNER. Application by letter. Salary not stated. Location, Virginia. V–1023.

STRUCTURAL STEEL DRAFTSMAN, familiar with making shop details. Application in person. Age 25, four years' experience. Location, Newark, N. J. V–1030.

INSTRUCTOR, CIVIL ENGINEERING, to teach hydraulics, highway engineering, and surveying. Application by letter. Location, New York. V–1035.

ENGINEER to interview architects and prospective builders of houses, $20 000-$50 000 class, to secure contracts for same. Territory, Greater New York, and 50-mile radius. Must be A–1 and know business from bottom up. Application in person. Salary plus liberal commission. Headquarters, New York City. V–1043.

DESIGNER AND DRAFTSMAN with hydroelectric (dam) experience. Application by letter. Salary not stated. Location, New York City. V–1046.

GENERAL BUILDING ESTIMATOR AND OFFICE ASSISTANT for work in Japan. Must be thoroughly experienced with at least ten years' experience. Application in person. V–1052.

THREE OR FOUR FIRST-CLASS STRUCTURAL DETAILERS for apartment houses, theatres, etc. Application in person. Location, Long Island City, N. Y. V–1053.

STRUCTURAL STEEL DETAILERS AND CHECKERS, industrial plant building. Application by letter. Salary not stated. Location, Pennsylvania. V–1088.

ENGINEERS experienced in corrugated paper production. Application by letter. Salary not stated. Location, Brooklyn, N. Y. V–1068.

OPERATOR on corrugated paper machines. Application by letter. Salary about $40 per week to start. Location, Brooklyn, N. Y. V–1069.

SUPERINTENDENT thoroughly familiar with all kinds of plain and reinforced concrete, especially cinder concrete arch floor construction. Must also be able to estimate on this line. Application by letter only. Salary not stated. Location, New York City. V–1078.

STRUCTURAL ENGINEER, with ten years' experience in building work and industrial plant layout, for position in engineering organization in charge of work including plans, specifications, and estimates. No detail work involved and excellent opportunities for advancement. In addition to full technical qualifications must have good address and ability to meet employer's clients. Application by letter with full details of experience and recent photograph. Location, New England. V–1126.

STRUCTURAL ENGINEERS for structural steel and reinforced concrete design. Work includes all types of buildings from power houses to office buildings and churches. Want A–1 men who wish to connect with an organization offering advancement to proper parties. Application by letter, stating experience, salary requirements, earliest reporting date, and also submit some of recent work. Salary not stated. Location, Michigan. V–1152.

MEN AVAILABLE

SUPERVISING ENGINEER, with business and executive training; Graduate Civil Engineer; age 35. Experienced power and hydraulic man, and thoroughly qualified on buildings and heavy construction, both structural and mechanical features. CE–333.

CIVIL ENGINEER AND SUPERINTENDENT OF CONSTRUCTION, M. Am. Soc. C. E.; age 47; married. Twenty years in charge of construction and maintenance of railways, reconnaissance, location, design; construction of bridges and buildings; extensive experience on concrete and foundations. Also, 7 years on irrigation, drainage, and municipal work. Passed U. S. Civil Service examinations for Irrigation Engineer and for Supervising Engineer. Speaks and writes French fluently. Active, dependable; highest references. Will go anywhere, but prefers United States. Now available. CE–334.

PLANT ENGINEER, Assoc. M. Am. Soc. C. E.; Graduate Civil Engineer; age 33; married. Eleven years' experience in design and construction of complete plants for quarries, mines, and mills, including structures, equipment, power plants, transportation systems, etc. Capable of taking charge of all engineering for these plants. Personal interview desired. CE–335.

GRADUATE ENGINEER, Assoc. M. Am. Soc. C. E.; age 31; married. Eleven years' experience in reinforced concrete and structural steel design. Accustomed to the preparation of designs and estimates on all types of reinforced concrete buildings from preliminary architectural sketches. Speaks French and has had sales experience. Prefers position with Sales Organization or General Contractor. Now located in Philadelphia, Pa. Minimum salary, $275 to $300 per month. CE–336.

ENGINEER, Graduate School of Mines, Columbia University; M. Am. Soc. C. E., Am. Soc. Mech. Engrs., and Am. Inst. Min. and Metal. Engrs. Specialty, iron and steel manufacture. Long practical experience. Excellent record and references. Available especially for consulting work anywhere in United States or abroad. CE–337.

MILL ARCHITECT AND ENGINEER, Assoc. M. Am. Soc. C. E.; age 38; married. Fourteen years' experience designing pulp and paper mills with appurtenant hydraulic and steam-power developments. Capable of taking responsible charge of purchase and arrangement of equipment, architecture, structural design, power requirements, specifications, and contracts. CE–338.

ENGINEER-MANAGER, Assoc. M. Am. Soc. C. E., age 30, with thorough business training, desires permanent connection as Engineer or Executive with commercial, industrial, utility or other organization where future advancement is possible. New York or Eastern States preferred. Now permanently employed in responsible charge. Water Supply Company operation and construction. CE–339.

ANNOUNCEMENTS

The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 6 P. M.

FUTURE MEETINGS

June 7th, 1922.—8 P. M.—A regular business meeting of the Society will be held on the Fifth Floor of the Engineering Societies Building, at which the "Tentative Specifications for Steel Railway Bridges" will be presented for informal discussion.

These Tentative Specifications were submitted as a Progress Report of the Special Committee on Specifications for Bridge Design and Construction and published in *Proceedings* for December, 1921. Discussion on the Report is printed in the April, 1922, *Proceedings*.

ANNUAL CONVENTION

The Fifty-second Annual Convention of the Society will be held at the Hotel Wentworth, Portsmouth, N. H., on June 21st and 22d, 1922. A circular giving full information as to the general programme, transportation, hotel rates, etc., was issued on May 19th, 1922.

SCHOLARSHIP IN CIVIL ENGINEERING AT COLUMBIA UNIVERSITY

The governing bodies of Columbia University have placed at the disposal of the Society, a scholarship in Civil Engineering in the Schools of Mines, Engineering and Chemistry of Columbia University, beginning with the academic year 1922-23 and continuing until further notice. The scholarship pays $350 toward the annual tuition fees, which vary from $340 to $360, according to the details of the course selected. Re-appointment of the student to the scholarship for the completion of his course is conditioned upon the maintenance of a good standing in his work.

To be eligible for the scholarship, the candidate recommended will have to meet the regular admission requirements, in regard to which full information will be sent without charge upon application to the Secretary of the University or to the Secretary of the Society.

In a letter addressed to the Secretary of the Society, an applicant for this scholarship should set forth his qualifications (age, place of birth, education, statement of any other activities, such as athletics or working way through college, references, and photograph). A committee composed of Messrs. Robert Ridgway, C. W. Hudson, and J. P. H. Perry will consider the applications and will notify the authorities of Columbia University of their selection of a candidate. The last day for the filing of applications will be July 1st of each year.

The course at the Columbia Schools of Mines, Engineering and Chemistry is three years in length and is on a graduate basis. A candidate for admission must have had a general education, including considerable work in mathematics, physics, and chemistry. Three years of preparatory work in a good college or scientific school should be sufficient, if special attention has been given to the three preparatory subjects mentioned. A college graduate, with a Bachelor of Science degree in engineering, can generally qualify to advantage. The candidate is admitted on the basis of his previous collegiate record, and without undergoing special examinations. Other qualifications being equal, members of Student Chapters of the Society will be given preference.

The purpose of this advanced course is to produce a high type of engineer, trained in the humanities as well as in the fundamentals of his profession. It is hoped that members will show a keen interest in this scholarship, which will insure the choice of a candidate of the highest qualifications.

LOCAL SECTIONS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

San Francisco Section (Constitution Approved by Board, 1905).

Thomas H. Means, President; H. D. Dewell, Secretary-Treasurer, 503 Market Street, San Francisco, Cal.

Colorado Section (Constitution Approved by Board, 1909).

A. N. Miller, President; Thomas H. Olds, Secretary-Treasurer, First National Bank Building, Denver, Colo.

Atlanta Section (Constitution Approved by Board, 1912).

William C. Spiker, President; Frederick H. McDonald, Secretary-Treasurer, 1530 Healy Building, Atlanta, Ga.

Baltimore Section (Constitution Approved by Board, 1914).

Ezra B. Whitman, President; George S. Robertson, Sr., Secretary-Treasurer, 1628 Linden Avenue, Baltimore, Md.

Buffalo Section (Constitution Approved by Board, 1921).

Walter McCulloh, President; John H. Feigel, Secretary-Treasurer, 492 Minnesota Ave., Buffalo, N. Y.

Central Ohio Section (Constitution Approved by Board, 1921).

Frank W. Jennings, President; H. F. Schryver, Secretary, 405 New York Central Building, Columbus, Ohio.

Cincinnati Section (Constitution Approved by Board, 1920).

Edgar Dow Gilman, President; Alphonse M. Westenhoff, Secretary, 709 Gwynne Bldg., Cincinnati, Ohio.

Cleveland Section (Constitution Approved by Board, 1915).

A. V. Ruggles, President; George H. Tinker, Secretary-Treasurer, 516 Columbia Building, Cleveland, Ohio.

Connecticut Section (Constitution Approved by Board, 1919).

Harold W. Griswold, President; Clarence M. Blair, Secretary-Treasurer, 785 Edgewood Avenue, New Haven, Conn.

Dayton Section (Constitution Approved by Board, 1922).

Charles H. Paul, President; K. C. Grant, Secretary-Treasurer, Winters Bank Building, Dayton, Ohio.

Detroit Section (Constitution Approved by Board, 1916).

H. H. Esselstyn, President; Alex. Linn Trout, Secretary-Treasurer, 110 North Ingalls Street, Ann Arbor, Mich.

District of Columbia Section (Constitution Approved by Board, 1916).

Gratz B. Strickler, President; James H. Van Wagenen, Secretary-Treasurer, 2001 Sixteenth Street, N. W., Washington, D. C.

Duluth Section (Constitution Approved by Board, 1917).

John L. Pickles, President; Walter G. Zimmermann, Secretary, 203 Wolvin Building, Duluth, Minn.

Illinois Section (Constitution Approved by Board, 1916).

A. J. Hammond, President; W. D. Gerber, Secretary-Treasurer, 913 Chamber of Commerce, Chicago, Ill.

Iowa Section (Constitution Approved by Board, 1920).

J. H. Dunlap, President; R. W. Crum, Secretary, Care, Iowa State Highway Commission, Ames, Iowa.

Kansas City (Mo.) Section (Constitution Approved by Board, 1921).

John V. Hanna, President; Henry C. Tammen, Secretary-Treasurer, 1012 Baltimore Avenue, Kansas City, Mo.

Kansas Section (Constitution Approved by Board, 1920).

L. E. Conrad, President; Frank S. Altman, Secretary-Treasurer, 1114 Garfield Avenue, Topeka, Kans.

Los Angeles Section (Constitution Approved by Board, 1913).

Ralph J. Reed, President; Floyd G. Dessery, Secretary, 618 Central Building, Los Angeles, Cal.

Louisiana Section (Constitution Approved by Board, 1914).

Donald Derickson, President; F. A. Muth, Secretary, 224 Custom House Building, New Orleans, La.

Nashville Section (Constitution Approved by Board, 1921).

B. H. Klyce, President; L. C. Anderson, Secretary-Treasurer, Bridge Building, Nashville, Tenn.

Nebraska Section (Constitution Approved by Board, 1917).

William Grant, President; Homer V. Knouse, Secretary-Treasurer, 200 City Hall, Omaha, Nebr.

New York Section (Constitution Approved by Board, 1920).

Nelson P. Lewis, President; J. P. J. Williams, Secretary, 33 West 39th Street, New York City.

Northeastern Section (Constitution Approved by Board, 1921).

Frank B. Sanborn, Chairman; Charles W. Banks, Secretary, 715 Tremont Temple, Boston, Mass.

Northwestern Section (Constitution Approved by Board, 1914).

W. T. Walker, President; Paul C. Gauger, Secretary, 300 Endicott Building, St. Paul, Minn.

Oklahoma Section (Constitution Approved by Board, 1920).

Max L. Cunningham, President; R. E. Brownell, Secretary-Treasurer, 402 First National Bank Building, Oklahoma, Okla.

Philadelphia Section (Constitution Approved by Board, 1913).

Benjamin Franklin, President; S. C. Hollister, Secretary, 1200 Land Title Building, Philadelphia, Pa.

Pittsburgh Section (Constitution Approved by Board, 1918).

J. N. Chester, President; Nathan Schein, Secretary-Treasurer, 1510 Carson Street, Pittsburgh, Pa.

Portland (Ore.) Section (Constitution Approved by Board, 1913).

F. M. Randlett, President; C. P. Keyser, Secretary, 318 City Hall, Portland, Ore.

Providence (R. I.) Section (Constitution Approved by Board, 1920).

Sydney Wilmot, Chairman; Robert L. Brown, Secretary-Treasurer, 26 Sycamore Street, Providence, R. I.

St. Louis Section (Constitution Approved by Board, 1914).

E. B. Fay, President; William C. E. Becker, Secretary-Treasurer, 426 City Hall, St. Louis, Mo.

San Diego Section (Constitution Approved by Board, 1915).

P. R. Watson, President; J. Y. Jewett, Secretary-Treasurer, Administration Building, Balboa Park, San Diego, Cal.

Seattle Section (Constitution Approved by Board, 1913).

F. F. Sinks, President; Frank H. Fowler, Secretary-Treasurer, 1319 L. C. Smith Building, Seattle, Wash.

Spokane Section (Constitution Approved by Board, 1914).

C. A. Burnette, President; Charles E. Davis, Secretary-Treasurer, 401 City Hall, Spokane, Wash.

Texas Section (Constitution Approved by Board, 1913).

E. B. Cushing, President; E. N. Noyes, Secretary, 1107 Dallas County Bank Building, Dallas, Tex.

Toledo Section (Constitution Approved by Board, 1922).

M. J. Riggs, President; George N. Schoonmaker, Secretary-Treasurer, High-Pressure Fire Service Station, Cherry and Water Streets, Toledo, Ohio.

Utah Section (Constitution Approved by Board, 1916).

B. W. Matteson, President; H. S. Kleinschmidt, Secretary-Treasurer, 222 Felt Building, Salt Lake City, Utah.

Virginia Section (Constitution Approved by Board, 1922).

J. C. Carpenter, President; James F. MacTier, Secretary-Treasurer, 1312 Maple Avenue, Roanoke, Va.

STUDENT CHAPTERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS*

Stanford University.

R. I. Hill, President; John H. Colton, Corresponding Secretary, Box 121, Stanford, Calif.

* By a recent ruling of the Board of Direction, the minimum membership of a Student Chapter has been fixed at 12 instead of 20.

Alabama Polytechnic Institute.

R. O. Davis, President; A. R. Harvey, Jr., Secretary-Treasurer, Box 661, Auburn, Ala.

Braune Civil Engineering Society (University of Cincinnati).

John W. Guilday, President; C. A. Harrell, Secretary of Section 10; R. Blickensderfer, Secretary of Section 20; University of Cincinnati, Cincinnati, Ohio.

Bucknell University.

Ralph F. Hartz, President; Donald A. Davis, Secretary, Bucknell University, Lewisburg, Pa.

California Institute of Technology.

W. M. Taggart, President; Douglas A. Stromsoe, Secretary, California Institute of Technology, Pasadena, Calif.

Carnegie Institute of Technology.

H. T. Ward, President; J. K. Elliott, Secretary, Carnegie Institute of Technology, Pittsburgh, Pa.

Clemson Agricultural and Mechanical College of South Carolina.

J. H. Baumann, President; W. J. Stribling, Secretary, Clemson Agricultural and Mechanical College of South Carolina, Clemson College, S. C.

Cornell University.

James Hannigan, President; Albert Lucas, Secretary-Treasurer, Lincoln Hall, Cornell University, Ithaca, N. Y.

Drexel Institute.

C. V. Nishwitz, Chairman; Raymond Radbill, Secretary, Drexel Institute, Philadelphia, Pa.

Georgia School of Technology.

F. H. Harrison, President; C. M. Kennedy, Jr., Secretary, 91 West North Avenue, Atlanta, Ga.

Iowa State College.

Raymond L. Whannel, President; C. La Verne Day, Secretary, Iowa State College, Ames, Iowa.

Johns Hopkins University.

W. A. Randall, President; I. M. Zeskind, Secretary, Johns Hopkins University, Baltimore, Md.

Lafayette College.

Douglas M. Brown, President; Ivan C. Blickenstaff, Secretary, Lafayette College, Easton, Pa.

Lehigh University

John N. Marshall, President; George R. Swinton, Lehigh University, Bethlehem, Pa.

Massachusetts Institute of Technology

George Eric Barnes, President; Ralph Rutherford Dresel, Secretary, 53 Brook Street, Brookline, Mass.

Montana State College.

Merrill J. Alquist, President; Emmett Moore, Secretary, 921 South Third Avenue, Bozeman, Mont.

New York University.

George H. Martin, President; Abram J. Jacobs, Secretary, 302 Gould Hall, New York University, New York City.

Norwich University.

J. H. Kane, President; Allen J. Hamilton, Secretary, Norwich University, Northfield, Vt.

Ohio State University.

O. W. Merrell, President; William M. Ruddicks, Secretary, 65 Thirteenth Avenue, Columbus, Ohio.

Oregon State Agricultural College.

Richard D. Slater, President; Wilbur H. Welch, Secretary, Oregon State Agricultural College, Corvallis, Ore.

Pennsylvania State College.

Arthur H. McFadden, President; William W. Seltzer, Secretary, Pennsylvania State College, State College, Pa.

Polytechnic Institute of Brooklyn.

W. C. Hanning, President; S. Lordi, Secretary, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Purdue University.

R. O. Edwards, President; W. C. Mason, Secretary-Treasurer, Purdue University, West Lafayette, Ind.

Rensselaer Polytechnic Institute.

William Minot Thomas, President; Earl D. Hopkins, Secretary, 147 Eighth Street, Troy, N. Y.

Rose Polytechnic Institute.

Robert Cash, President; F. Ray Martin, Secretary-Treasurer, Rose Polytechnic Institute, Terre Haute, Ind.

Rutgers College.

L. C. Kuhl, President; A. C. Ely, Secretary, 105 Winants Hall, Rutgers College, New Brunswick, N. J.

State University of Iowa.

James Fred Phillips, President; Louis E. Baggs, Secretary, State University of Iowa, Iowa City, Iowa.

Swarthmore College.

Frank Lemke, President; H. Chandlee Turner, Jr., Secretary, Swarthmore College, Swarthmore, Pa.

Syracuse University.

Arthur V. Dollard, Secretary, College of Applied Science, Syracuse University, Syracuse, N. Y.

University of California.

E. F. Sutherland, President; H. E. Hedger, Secretary, University of California, Berkeley, Calif.

University of Colorado.

Herbert Altvater, President; Charles Bowden, Secretary, 1229 University Avenue, Boulder, Colo.

University of Illinois.

A. L. R. Sanders, President; M. E. Jansson, Secretary, University of Illinois, Urbana, Ill.

University of Kansas.

W. W. Hoagland, President; Waldo G. Bowman, Secretary, 1106 Ohio Street, Lawrence, Kans.

University of Kentucky.

H. J. Beam, President; H. E. Glenn, Secretary-Treasurer, 348 Harrison Avenue, Lexington, Ky.

University of Maine.

Ian M. Rusk, President; Clarence B. Gould, Secretary, Sigma Phi Sigma House, University of Maine, Orono, Me.

University of Minnesota.

C. L. Swanson, President, 1716 Tyler Street, N. E., Minneapolis, Minn.

University of Missouri.

W. S. McDaniel, President; J. D. Sandker, Secretary, 407 West Broadway, Columbia, Mo.

University of Nebraska.

J. E. Applegate, President; W. H. Mengel, Secretary, University of Nebraska, Lincoln, Nebr.

University of North Carolina.

H. G. Baity, President; L. I. Lassiter, Secretary, University of North Carolina, Chapel Hill, N. C.

University of Pennsylvania.

Charles W. Foppert, President; Fred Welchy, Secretary, University of Pennsylvania, Philadelphia, Pa.

University of Pittsburgh.

L. W. Fletcher, President; J. M. Daniels, Secretary, University of Pittsburgh, Pittsburgh, Pa.

University of Texas.

Frank Cannon, President; Claude Riney, Secretary, 1908 Wichita Street, Austin, Tex.

University of Virginia.

Jack A. Gunn, Secretary and Treasurer, Box 428, University, Va.

University of Washington.

B. W. Brown, President; G. E. Large, Secretary, 4518 Eleventh Avenue, N. E., Seattle, Wash.

University of Wisconsin.

E. K. Loverud, President; L. H. Kessler, Secretary, 235 West Gilman Street, Madison, Wis.

Virginia Military Institute.

Benjamin F. Parrott, President; R. G. Hunt, Secretary-Treasurer, Virginia Military Institute, Lexington, Va.

Virginia Polytechnic Institute.

W. S. Miles, President; J. Byron Herring, Secretary, Virginia Polytechnic Institute, Blacksburg, Va.

Washington University Collimation Club.

William D. Rolfe, President; Erwin Bloss, Secretary, Washington University, St. Louis, Mo.

West Virginia University.

J. E. Wheeler, President; Milton Jarrell, Secretary, 113 Beverely Avenue, Morgantown, W. Va.

Worcester Polytechnic Institute.

Carl F. Meyer, President; Albert P. Haydon, Secretary, Worcester Polytechnic Institute, Worcester, Mass.

Yale University.

W. S. Moore, President; T. T. McCrosky, Secretary, Sheffield Scientific School, Yale University, New Haven, Conn.

NEW BOOKS*

(From April 1st, to April 29th, 1922)

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

DONATIONS TO ENGINEERING SOCIETIES LIBRARY

PRINCIPLES OF ELECTRICAL ENGINEERING.

By William H. Timbie and Vannevar Bush. N. Y., John Wiley & Sons, Inc.; Lond., Chapman & Hall, Ltd., 1922. 513 pp., illus., 8 x 5 in., cloth. $4.00.

This textbook, written for students of college grade, with a knowledge of calculus and physics, aims to provide a substantial first course in the subject, which will present rigorously, yet in understandable form, the basic principles underlying modern electrical engineering, to be followed by detailed courses in direct and alternating-current machinery. Special features are the stressing of the subject of the magnetic circuit; the use of the electron theory as a basis for explanation; the inclusion of the subjects of thermionic emission, conduction through gases, electrolytic conduction, and high-frequency phenomena; a novel approach to the subject of the behavior of dielectrics; and numerous live problems.

CONTINUOUS WAVE WIRELESS TELEGRAPHY.

By B. E. G. Mittell. (Pitman's Technical Primers.) Lond. and N. Y., Sir Isaac Pitman & Sons, Ltd., 1922. 110 pp., illus., 7 x 4 in., cloth. 85 cents.

This little book is offered as an introduction to radiotelegraphy from the engineer's point of view. It avoids the use of mathematics and goes directly into the subject without a preliminary discourse on electricity or the development of mechanical analogies. Special attention, so far as space permits, is given to the Poulsen arc and to the construction of tall aerial structures, and useful references to important papers are given throughout the book.

AUTOMATIC TELEPHONE SYSTEMS.

By William Aitken. Vol. 1, Circuits and Apparatus as Used in the Public Services. Lond., Benn Brothers, Ltd., 1921. 282 pp., diagrams, 10 x 8 in., cloth. 25 shillings.

The great mass of detail and the complicated circuit diagrams required to present this subject to students make special treatment necessary. This book attempts to present the subject in intelligible form by re-arranging the diagrams, eliminating unnecessary crossing lines, simplifying the form, and presenting them in such a way as to show the relationship of the system as a whole. To accomplish these ends, a large page and a new system of describing the diagrams, which consists in numbering a circuit from end to end with the same system, have been used. The book covers the whole subject. The principal commercial systems and other less-known systems of promise are described.

DESIGN AND CONSTRUCTION OF OIL ENGINES.

By A. H. Goldingham. Fifth Edition. N. Y., Spon & Chamberlain; Lond., E. & F. N. Spon, 1922. 2 pt. in 1 v., illus., diagrams, 8 x 5 in., cloth. $4.00.

This treatise comprises two parts. The first part is entirely new and contains 141 pages devoted to high-compression oil engines, including solid injection, air-blast and modern two-cycle engines. The design and construction of the parts of these engines, testing, installation, and construction are considered, and the leading American and English designs are discussed. The second part relates to earlier types of low-compression oil engines. It is apparently a reprint of the fourth edition of the work, with the omission of the Appendix on Diesel engines, now included in a separate treatise on that subject.

PRINCIPLES OF MECHANICAL REFRIGERATION.

By H. J. Macintire. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 252 pp., illus., diagrams, 8 x 6 in., cloth. $2.50.

Based on a "study course" of twenty articles published in *Power* during 1920, the book is intended to cover the entire field of refrigeration in an elementary manner, with little use of mathematics. Analogies to steam machinery and steam cycles are used to explain the action of refrigeration.

MECHANICAL STOKERS.

By Joseph G. Worker and Thomas A. Peebles. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 258 pp., illus., tab., diagrams, 9 x 6 in., cloth. $3.00.

* Unless otherwise specified, books in this list have been donated by the publishers.

Although stokers are treated in books on boilers and power-plant equipment, there has been no work treating of them as a separate unit, until the appearance of the present volume. It discusses the phenomena of combustion in relation to stokers, describes mechanical stokers and modern practice in stoker installation and use, and discusses the selection of stokers for different fuels and differing conditions. The authors have endeavored to give reliable, unbiased opinions and facts from field experience in design, installation, and operation.

ANALYSIS OF FUEL, GAS, WATER, AND LUBRICANTS.

By S. W. Parr. Third Edition. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 250 pp., illus., diagrams, tab., 8 x 6 in., cloth. $2.50.

This book was originally published for use by students of mechanical engineering, and provided a course intended to help the engineer to a better understanding of the literature of the topics treated, and also to an appreciation and more intelligent use of data supplied by the chemist. The present edition has been expanded to meet the needs of students of chemistry as well. It contains a synopsis of the author's lectures on fuel, gas, water and lubricants, and a course in laboratory methods for their analysis.

WELL-BORING FOR WATER, BRINE, AND OIL.

By C. Isler. Third Edition. Lond., E. & F. N. Spon, Ltd.; N. Y., Spon & Chamberlain, 1921. 259 pp., illus., diagrams, 9 x 6 in., cloth. $4.80.

The author describes various methods of boring and drilling in search of water, brine, oil, or minerals, including driven and bored tube wells; the Kind-Chaudron, Dru and Mather and Platt deep-boring systems; the American rope-boring system, and diamond-drilling. Methods of raising water are dealt with. This edition is revised and includes the methods developed during recent years.

GENERAL ECONOMIC GEOLOGY.

By William Harvey Emmons. N. Y. and Lond., McGraw-Hill Book Co., Inc., 1922. 516 pp., illus., 9 x 6 in., cloth. $4.00.

This volume is an introduction to the study of mineral deposits, for use by students with a knowledge of the elements of general geology and mineralogy. It embraces the geology of mineral fuels, structural materials, and other non-metals, and of the metals. The first chapter includes introductory matter, definitions, and an outline of the classification of mineral deposits. It is followed by a treatment of coal, petroleum, and the solid bitumens. Then follows a more detailed discussion of the classification and genesis of mineral deposits, which is succeeded by sections on non-metals and metals. Numerous footnotes call attention to the principal sources of information on each topic.

ABRISS DER LEHRE VON DEN ERZLAGERSTATTEN.

Von Richard Beck, bearbeitet durch Georg Berg. Berlin, Gebrüder Borntraeger, 1922. 408 pp., illus., 10 x 7 in., paper. $3.60.

During his latter years Dr. Beck had in mind the preparation of an abridgment of his well-known treatise on ore-deposits which would be suitable as a college textbook and a survey of the principal information on the subject for use by geologists whose chief interests lie along other lines. With this in view, he had corrected and annotated a copy of the third edition of the treatise, when his death in 1919 made it necessary to entrust the preparation of the present work to Mr. Berg, one of his earliest assistants. This outline is approximately one-third the size of the original work, which it follows in plan and arrangement. Condensation has been effected in the different chapters by bringing together the less important occurrences, that are interesting for geological or other reasons, as examples in a general description of the corresponding groups of deposits. The number of ore formations has been reduced by combining certain groups, and the chapter on epigenetic deposits has been shortened.

METRIC SYSTEM FOR ENGINEERS.

By Charles B. Clapham. (Directly-Useful Technical Series.) N. Y., E. P. Dutton & Co., 1922. 181 pp., 9 x 6 in., cloth. $6.00.

This book is not concerned with the controversy regarding the metric system. Its object is to give a full, practical explanation of the system as it is met in engineering calculation and measurement, for use by draftsmen, mechanics, and engineers. After an introduction explaining basic principles, the simple measures of length, area, volume, capacity, and weight are discussed, with special attention to the usual measuring tools found in workshops and drafting rooms. Compound measures used in engineering are then described, with the derivation of the corresponding British equivalents. Succeeding chapters give tables of the more common engineering constants in British and metric units, and examples of the alteration of numerical constants in formulas when metric values are to be used.

INTRODUCTION TO ELECTRO-DYNAMICS.

By Leigh Page. Boston and N. Y., Ginn & Co., 1922. 134 pp., 8 x 6 in., cloth. $2.00.

The object of this book is to present a logical development of electro-magnetic theory founded on the principle of relativity. So far as the author is aware, the universal procedure has been to base the electro-dynamic equations on the experiments of Coulomb,

Ampère, and Faraday, even books on the principle of relativity going no farther than to show that these equations are co-variant for the Lorentz-Einstein transformation. As the dependence of electro-magnetism on the relativity principle is more intimate than this co-variance suggests, he believes it more logical to derive the electro-magnetic equations directly from this principle. The book covers topics appropriate for a one-year graduate course in electro-dynamics and electro-magnetic theory of light. It should interest those who are looking for a logical rather than a historical account of the science.

ORGANIC CHEMISTRY.

By Victor von Richter. Vol. 2: Chemistry of the Carbocyclic Compounds. Phila., P. Blakiston's Son & Co., 1922. 760 pp., 9 x 6 in., cloth. $8.00.

After an interval of six years since the appearance of the first volume, the second volume of this translation, dealing with the carbocyclic or closed carbon chain compounds, is now available. The translation follows the 11th German edition, prepared in 1912. The outstanding feature of this work is the large number of compounds listed, with outlines of the methods for preparing them and accounts of their important properties. No other book of its size gives such an exhaustive list. Because of this comprehensiveness, the book is most useful for reference, particularly when the large encyclopedias are not accessible.

CRAIN'S MARKET DATA BOOK AND DIRECTORY OF CLASS, TRADE,

And Technical Publications. Second Edition. Chic., G. D. Crain, Jr., 1922. 456 pp., 9 x 6 in., cloth. $5.00.

This is a reference book for advertisers. An account of trade, industry, and profession is given, which presents the statistical and marketing data necessary to give the advertiser or merchant a picture of the field as a whole. Each account is supplemented by a full list of American trade journals devoted to that industry, with their addresses, circulation, advertising rates, etc. A list of important foreign trade journals is included.

ESSAI D'OPTIQUE SUR LA GRADATION DE LA LUMIÈRE.

By Pierre Bouguer. (Les Maîtres de la Pensée Scientifique.) Paris, Gauthier-Villars et Cie., 1921. 129 pp., 7 x 5 in., paper. 3 francs.

This classic of the literature of optics is an account of Bouguer's study of certain important optical problems connected with the radiation of light and its absorption by various substances. It is the work which first set forth the basis of photometry, and led to the invention of the photometer by the author in 1748. The present edition reproduces the original text of 1729.

DONATIONS TO READING ROOM

PULLING TOGETHER.

By John T. Broderick. With Introduction by Charles P. Steinmetz. Schenectady, N. Y., Robson & Adee, 1922. 141 pp., 7½ x 5 in., cloth. $1.00.

The author of this work has had exceptional opportunities for the study of industrial problems, and discusses the great question before the industrial world of to-day, that of conciliation and co-operation of labor and capital. The book is written in a style interesting to the average reader as well as to industrial managers and engineers.

COLLECTED PAPERS ON ACOUSTICS.

By Wallace Clement Sabine. Cambridge, Harvard University Press; Lond., Humphrey Milford, 1922. 279 pp., illus., diagrams, 10¼ x 7½ in., cloth. $4.00.

This book is a compilation of all the important contributions to the subject of architectural acoustics written by the author most of which have appeared previously in various architectural journals.

MEMBERSHIP

(From April 5th to May 2d, 1922)

ADDITIONS

MEMBERS		Date of Membership.
ADAMS, LEWIS MILTON. Maj., Corps of Engrs., U. S. A.; Dist. Engr., Galveston, Tex		April 3, 1922
ANDERBERG, EDWARD. Senior Asst. Engr., Barge Canal Terminals, Pier 6, East River, New York City.	Jun.	Mar. 5, 1907
	Assoc. M.	Mar. 1, 1910
	M.	April 4, 1922
BELL, JOSEPH EDGAR. Engr., The Montana Power Co., Butte, Mont	Assoc. M.	Oct. 3, 1911
	M.	April 4, 1922
CONVERSE, JOSEPH BRANDLY. Cons. Engr., 700-B Interstate Bank Bldg., New Orleans, La	Assoc. M.	May 15, 1917
	M.	April 4, 1922
COWPER, JOHN WHITFIELD. Pres., The John W. Cowper Co., Fidelity Bldg., Buffalo, N. Y	Jun.	June 21, 1894
	Assoc. M.	Oct. 2, 1901
	M.	April 4, 1922
CRANDALL, LYNN. Water Commr. for Big Lost River, Mackay, Idaho	Jun.	Dec. 6, 1910
	Assoc. M.	April 7, 1915
	M.	April 4, 1922
CURTISS, CHARLES DWIGHT. Senior Highway Engr., U. S. Bureau of Public Roads, Washington, D. C		April 3, 1922
DIGNUM, HARRY JOCELYN. Supt. of Railroads, Transportation, and Eng., Baragua Sugar Co., Baragua, Camaguey, Cuba	Assoc. M.	April 2, 1913
	M.	April 4, 1922
DOUGHERTY, NATHAN WASHINGTON. Prof., Civ. Eng., Univ. of Tennessee, Knoxville, Tenn	Assoc. M.	Jan. 13, 1919
	M.	April 4, 1922
DOUSMAN, JAMES HOPKINS. (Dousman Pump & Machinery Co.), 318 Reliance Bldg., Kansas City, Mo		April 3, 1922
FOWLER, JAMES DUNCAN. Cons. Engr. (Koch & Fowler), 606 Sumpter Bldg., Dallas, Tex	Assoc. M.	Oct. 7, 1914
	M.	Nov. 21, 1921
FRAZIER, FORREST FAYE. Associate Prof., Civ. Eng., Kansas State Agricultural Coll., Manhattan, Kans.	Assoc. M.	May 31, 1916
	M.	April 4, 1922
FREELAND, FRANCIS EUGENE. Pres., Freeland Roberts Co., 1212 Independent Life Bldg., Nashville, Tenn.	Assoc. M.	Sept. 3, 1913
	M.	April 4, 1922
HARVEY, FORREST SHEPHERD. Res. Engr., Representing Chas. T. Main and The Am. Sugar Refining Co., 836 Park Ave., Baltimore, Md		April 3, 1922
HOPPIN, WILLIAM PIERCE. Asst. Engr., James Walker, 839 Edison Bldg., Chicago, Ill		April 3, 1922
HURLBUT, WILLIAM WHITEHEAD. Office Engr., Bureau of Water Works and Supply, City of Los Angeles (Box 497), M. O., Los Angeles, Calif	Assoc. M.	Sept. 3, 1913
	M.	April 4, 1922
JOHNSTON, EDWARD NEELE. Lt.-Col., Corps of Engrs., U. S. A., U. S. Engr. Office, Room 405, Customhouse, Cincinnati, Ohio.		Oct. 10, 1921
KOSS, GEORGE WALTHER. Pres. and Gen. Mgr., Koss Constr. Co., Des Moines, Iowa	Assoc. M.	June 6, 1911
	M.	April 4, 1922
LABOON, JOHN FRANCIS. Hydr. and San. Engr. (The J. N. Chester Engrs.), 1111 Union Bank Bldg., Pittsburgh, Pa	Assoc. M.	April 14, 1919
	M.	April 4, 1922

MEMBERS—(*Continued*)

		Date of Membership.
LAMBE, CLAUDE MILTON. Res. Engr., Joint Bldg. Committee, Box 640, Raleigh, N. C.	Assoc. M.	Dec. 6, 1915
	M.	April 4, 1922
LANAGAN, FRANK RAY. City Engr. (Res., 114 Chestnut St.), Albany, N. Y.	Jun.	Sept. 5, 1905
	Assoc. M.	Feb. 1, 1910
	M.	April 4, 1922
PRESTON, PORTER JOHNSTONE. Project Mgr., U. S. Reclamation Service, Yuma, Ariz.		April 3, 1922
ROSS, ROBERT JOHN. Asst. City Engr., Municipal Bldg., Hartford, Conn.	Assoc. M.	May 7, 1913
	M.	April 4, 1922
SCHUBERT, CHARLES WESLEY. Engr. for R. C. Products Trust, 17837 Landseer Rd., Cleveland, Ohio.	Assoc. M.	Aug. 31, 1909
	M.	April 4, 1922
SECREST, THOMAS WILLIAM. Supt. of Constr., Alaskan Eng. Comm., 606 Diamond Ave., Hillyard, Wash.	Assoc. M.	April 17, 1917
	M.	April 4, 1922
SMITH, WALTER DORR. Asst. Engr., City Engr.'s Office, 4561 Glen Albyn Drive, Los Angeles, Calif.	Assoc. M.	June 30, 1911
	M.	Jan. 20, 1922
TRAUGOTT, ALBERT MASER. Asst. Chf. Engr., The Virginian Ry., Terminal Bldg., Norfolk, Va.		April 3, 1922
VERVEER, EMANUEL LOUIS. Cons. Engr., 25 Church St. (Res., 600 West 179th St.), New York City	Assoc. M.	June 3, 1903
	M.	April 4, 1922
WATSON, MARTIN WALLACE. State Highway Engr. of Kansas, Care, State Highway Comm., Topeka, Kans.	Assoc. M.	Jan. 13, 1919
	M.	April 4, 1922
WIGHT, FRANK CLINTON. Managing Editor, *Engineering News-Record*, Tenth Ave., at 36th St., New York City (Res., 32 Waldron Ave., Summit, N. J.)		April 3, 1922
WILDER, ELLWOOD COGGESHALL. Engr., Dept.; Water and Sewers, 1718 Anapuni St., Honolulu, Hawaii.	Jun.	June 30, 1910
	Assoc. M.	May 13, 1918
	M.	Jan. 20, 1922
WINN, GEORGE PHILIP. City Engr., Municipal Bldg., Nashua, N. H.	Assoc. M.	Aug. 31, 1915
	M.	April 4, 1922

ASSOCIATE MEMBERS

AKERS, EDWIN RYAN. Reinforced Concrete Designer, Frederick Snare Corporation, Box 733, Havana, Cuba	Jun.	July 6, 1920
	Assoc. M.	April 3, 1922
BARBER, CHARLES WIGHTMAN. 3428 Brown St., N. W., Washington, D. C.	Jun.	Nov. 3, 1915
	Assoc. M.	April 3, 1922
BARKER, HAROLD WARD. Structural Engr., George D. Mason & Co., 1534 Dime Bank Bldg., Detroit, Mich.		April 3, 1922
BOYLE, FRANCIS ALOYSIUS. With Thomas E. Murray, Inc., 55 Duane St. (Res., 1283 Morris Ave.), New York City		April 3, 1922
BRAVERMAN, SIGMUND. Designing Engr., Swirsky & Miller, 600 Herberich Bldg., Akron, Ohio		April 3, 1922
BROWN, LEO FRANCIS. Care, J. C. Brackenridge, 95 Liberty St., New York City (Res., 1206 New York Ave., Brooklyn, N. Y.)	Jun.	Sept. 10, 1918
	Assoc. M.	April 3, 1922
CLARK, MILES ELLIOTT. Asst. Engr., Dept. of Public Works, State of Washington, Olympia, Wash.		Nov. 21, 1921

ASSOCIATE MEMBERS—(*Continued*)

	Date of Membership.
CLINGER, ROBERT HENRY. 905 Main St. (Res., 221 Pembroke Ave.), Dallas, Tex	April 3, 1922
COPELAND, ROBERT MORRIS. Capt., Corps of Engrs., U. S. A., Camp A. A. Humphreys, Va. (Res., 1470 Munroe St., Denver, Colo.)	Jun. Dec. 2, 1914 Assoc. M. Jan. 14, 1922
CUMMINGS, ALBERT EDWARD. Office Engr., Raymond Concrete Pile Co., 111 West Monroe St., Room 1912, Chicago, Ill	April 3, 1922
DOCKSTADER, ERNEST AMBROSE. Engr., Structural Div., Stone & Webster, Inc., 147 Milk St., Boston 5, Mass	April 3, 1922
DONALD, JOHN ARNOLD. Asst. Engr. with City Engr., City Engr.'s Office, Wichita Falls, Tex	April 3, 1922
DUBOIS, ROBERT SEWALL. Bridge Engr., Colorado State Highway Dept., Denver, Colo	April 3, 1922
ETCHISON, BOWIE GRIFFITH. Dist. Engr., Kanawha County, Court House (Res., 28 California Pl.), Charleston, W. Va	April 3, 1922
FENNER, JOHN SHERROD. Res. Engr., Bartlett & Ranney, Inc., Kaufman, Tex	April 3, 1922
FOSTER, HENRY ALDEN. Asst. Engr., New York Water Power Investigation, 205 Garfield Pl., South Orange, N. J	April 3, 1922
FROSETH, OLAF. Asst. Engr., Ill. Cent. R. R., 4700 North Sacramento Ave., Chicago, Ill	April 3, 1922
FULEIHAN, NASRI SULEMAN. Care, The Standard Oil Co. of New York, Box 286, Jerusalem, Palestine.	Jun. Dec. 2, 1914 Assoc. M. April 3, 1922
FULKMAN, JOHN ALEXANDER. Senior Asst. Engr., Morris Knowles, Inc., Care, Elyria Water-Works, Lorain, Ohio	Nov. 21, 1921
GAEDCKE, CHARLES HENRY. Draftsman, Standard Oil Co., 533 Muriel Parkway, Elizabeth, N. J	April 3, 1922
GAYNOR, JOHN HENRY. Care, Dexter Portland Cement Co., Nazareth, Pa	April 3, 1922
GIBBONEY, HARRY SIMMERMAN. Dist. Mgr., Southern Office, National Steel Fabric Co., 604 Walton Bldg., Atlanta, Ga	April 3, 1922
GOODMAN, CHARLES RIVIERE. Asst. County Engr., Westcott Eng. Co., Box 757, Orange, Tex	April 3, 1922
HEMPLE, HENRY WILLIAM. Junior Hydrographic and Geodetic Engr., U. S. Coast and Geodetic Survey, 1120 Columbia Rd., N. W., Washington, D. C	April 3, 1922
HOLMBOE, LAWRENCE SCOFIELD. Contr. and Engr. (The Holmboe Co.), 424 West 2d St., Oklahoma, Okla.	Jun. April 18, 1916 Assoc. M. April 3, 1922
HOPKINS, ALFRED TURRILL. Asst. Valuation Engr., M. C. R. R., 351 M. C. R. R. Terminal, Detroit, Mich	April 3, 1922
HOWREN, WILLIAM DAVIS. Box 72, Amarillo, Tex	Assoc. M. April 3, 1922
IDLE, LEONARD AUGUSTUS. 813 West Grand Ave., Oklahoma, Okla.	April 3, 1922
JEMISON, LAWRENCE LEE. Bridge Engr., West Virginia State Road Comm., 16 California Pl., Charleston, W. Va	April 3, 1922
JOHNSTON, WARDELL D. County Engr., Black Hawk County, Waterloo, Iowa	April 3, 1922
JONES, ERNEST LESTER. Director, U. S. Coast and Geodetic Survey, Washington, D. C	April 3, 1922

ASSOCIATE MEMBERS—(*Continued*)

	Date of Membership.
LAMB, JOHN LONSDALE. 660 Warren St., Brooklyn, N. Y.	April 3, 1922
LARSON, EDWARD GUSTAF. 1 Granite St., Groton, Conn	April 3, 1922
LOWERY, JOHN, JR. 84 Leicester Court, Detroit, Mich. { Jun. / Assoc. M.	Jan. 6, 1915 / April 3, 1922
MCCLEVY, WILLIAM WILLSON. Asst. Dist. Engr., Virginia State Highway Comm., Box 215, Roanoke, Va	April 3, 1922
MCLEAN, JOHN ALEXANDER. City Engr., Box 227, Crookston, Minn.	April 3, 1922
MERRY, AUGUSTUS BRADFORD. 2427 Camp St., New Orleans, La	April 25, 1921
MORGAN, NATHAN WILSON. Draftsman and Designer, Colorado State Highway Dept., Denver, Colo	April 3, 1922
MORRIS, EARLE HEDDERICH. Chf. Engr., Board of Railroad Commrs., Box 446, Bismarck, N. Dak	April 3, 1922
NEWMAN, JAMES BLAINE. Asst. Prof., Architecture and Architectural Eng., Univ. of Michigan, 1221 Williard St., Ann Arbor, Mich	April 3, 1922
NEWSOM, REEVES JOSE. Commr. of Water Supply, City of Lynn, 11 Hovey Terrace, Lynn, Mass	April 3, 1922
OGLE, FRANK BENJAMIN. Res. Engr. in Chg., Highway Design, Coleman County, Box 545, Coleman, Tex	April 3, 1922
OLMSTEAD, CHARLES HAROLD. Div. Engr., State Highway Dept., 1401 Beechwood Ave., Nashville, Tenn	Nov. 21, 1921
ORR, HARRY CONNELLY. Supt., San. and Drainage Comm., 39 Broad St., Room 20, Charleston, S. C.	April 3, 1922
RASMUSSEN, ALVIN CHRISTIAN. Chf. Engr., Insley Mfg. Co., 5135 Central Ave., Indianapolis, Ind. { Jun. / Assoc. M.	Feb. 4, 1913 / April 3, 1922
SCHILLING, FRANK ADAM. Engr. and Contr., 636 North Harvard Boulevard, Los Angeles, Calif	Nov. 21, 1921
SHIELDS, PAUL REVERE. (J. B. Allen Eng. Co.), Hazard, Ky.	Oct. 10, 1921
SIMPSON, WILLARD EASTMAN. (W. E. Simpson Co.), 414 National Bank of Commerce Bldg. (Res., 1211 West Woodlawn Ave.), San Antonio, Tex	April 3, 1922
STONE, NELSON. Constr. Engr. (Stone & Woelfel, Inc.), 708 Maryland Ave., Syracuse, N. Y.	April 3, 1922
TALBOT, FRANK DEWITT. Structural and Concrete Designer, Filtration Works, City of Sacramento, 1125 L St., Sacramento, Calif.	April 3, 1922
VAN COTT, GEORGE HENRY. Engr. in Chg. of Constr., Lewis & Valentine Co., 47 East 34th St., New York City (Res., Glen Head, N. Y.)	Oct. 10, 1921
WASSON, JOSEPH HOUSTON. Field Engr., Portland Cement Assoc., 1108 West Lewanee St., Lansing, Mich	April 3, 1922
WHITE, WARREN GARDNER. Nevada, Iowa	April 3, 1922
WILCOX, FRANK DAY. Computer and Draftsman, Southern California Edison Co., 843 South Bonnie Brae, Los Angeles, Cal.	April 3, 1922
WILSON, NORMAN KENNETH. 415 M. & M. Bank Bldg. (Res., 1614 Grand Ave.), Milwaukee, Wis. { Jun. / Assoc. M.	Sept. 10, 1918 / April 3, 1922

JUNIORS

BARTON, CARL OSBORN. Asst. Engr., Board of Water Commrs., 176 East Jefferson Ave., Detroit, Mich	April 3, 1922

JUNIORS—(*Continued*)

	Date of Membership.
BIEHLER, KARL FERDNAND. Asst. Supt., Llewellyn Iron Works, Los Angeles, Calif.	April 3, 1922
DELEHANTY, WILLIAM BENEDICT. Borough Engr., Edgewater, N. J.	April 3, 1922
FREESE, SIMON WILKE. Asst. to County Highway Engr., 119 West Washington St., Paris, Tex.	April 3, 1922
GLIDDEN, JOSEPH HENRY. Asst. to County Engr., Kittitas County, Ellensburg, Wash.	April 3, 1922
GOLDMAN, BENJAMIN SHEPPARD. 460 Glenmore Ave., Brooklyn, N. Y.	April 3, 1922
HENDRY, JAMES HORACE. Chf. Asst. in Chg., Civ. Eng., The Hartford Elec. Light Co., 90½ Brook St., Hartford, Conn.	April 3, 1922
LAUTERHAHN, OTTO. 117 South Montgomery St., Trenton, N. J.	April 3, 1922
MOYER, RALPH ALTON. Instr., Iowa State Coll., 816 Grand Ave., Ames, Iowa.	April 3, 1922
PENNYBACKER, PERCY VIVIAN. 2606 Whitis Ave., Austin, Tex.	April 3, 1922
SCOVILLE, JOHN ALLEN. Lieut. (Senior Grade), C. E. C., U. S. N., Public Works Dept., Navy Yard, Mare Island, Vallejo, Calif.	April 3, 1922

REINSTATEMENTS

ASSOCIATE MEMBERS

	Date of Reinstatement.
BARKER, CHARLES WHITNEY TILLINGHAST.	April 5, 1922

RESIGNATIONS

MEMBERS

	Date of Resignation.
DUFRESNE, ALEXANDER RITCHIE.	April 18, 1922

ASSOCIATE MEMBERS

BRYAN, GEORGE, JR.	April 18, 1922
HERMAN, RALPH EMERSON, JR.	April 18, 1922
JOHNSON, LOUIS RAUB.	April 18, 1922
MILLER, DEMONT GEORGE.	April 18, 1922
MURPHY, EDWARD THEOBALD.	April 18, 1922
PRICE, JOSEPH PAUL.	April 18, 1922
SWETT, EVERETT HAROLD.	April 18, 1922
WALKER, WILLIAM KEMP.	April 18, 1922

JUNIORS

BAUER, JOHN, JR.	April 18, 1922

DEATHS

CHESLEY, FRANK EPHRAIM. Elected Associate Member, December 31st, 1913; died January 9th, 1922.

DAVIS, GEORGE ROBERT. Elected Associate Member, April 3d, 1907; died March 31st, 1922.

FOSTER, WILBUR FISK. Elected Member May 7th, 1873; died March 27th, 1922.

JENCKES, LAWRENCE BATES. Elected Junior, March 31st, 1891; Associate Member, October 7th, 1896; Member, September 6th, 1910; died March 29th, 1922.

DEATHS—(*Continued*)

KLINGNER, LOUIS WILLIAM. Elected Junior, October 31st, 1911; Associate Member, June 24th, 1914; died April 2d, 1922.

LANTZ, CLARENCE IVAN. Elected Associate Member, October 1st, 1913; died September 4th, 1921.

NEUDECKER, EMERET CLAUDE. Elected Associate Member, April 19th, 1920; died June 8th, 1921.

MORSE, CHARLES MILLER. Elected Member, January 2d, 1895; date of death unknown.

STEVENS, HORACE EDWARD. Elected Junior, November 1st, 1876; Member, April 4th, 1888; died February 15th, 1922.

Total Membership of the Society, May 2d, 1922, 10 330.

CURRENT CIVIL ENGINEERING LITERATURE

KEY TO ABBREVIATED REFERENCES TO PUBLICATIONS INDEXED*

Abbreviated References.	Publication.	Place.
Am. C. Inst.	*American Concrete Institute, Proceedings* (Y.)	Detroit
A. I. E. E.	*American Institute of Electrical Engineers, Journal* (M.)	New York
A. R. E. A.	*American Railway Engineering Association, Proceedings* (Y.)	Chicago
A. S. T. M.	*American Society for Testing Materials, Proceedings* (Y.)	Philadelphia
Am. Soc. C. E.	*American Society of Civil Engineers, Proceedings* (M.)	New York
Am. Soc. Mun. Impvts.	*American Society for Municipal Improvements, Proceedings* (Y.)	New York
Am. W. W. Assoc.	*American Waterworks Association, Journal* (Bi-M.)	Baltimore
Am. Wood Prs. Assoc.	*American Wood Preservers Association, Proceedings* (Y.)	Baltimore
Ann. P. et C.	*Annales des Ponts et Chaussées* (Bi-M.)	Paris
Ann. T. P. Belg.	*Annales des Travaux Publics de Belgique* (Bi-M.)	Brussels
Assoc. Ing. Gand	*Annales de l'Association des Ingénieurs sortis des Ecoles Spéciales de Gand* (Q.)	Ghent
Bost. Soc. C. E.	*Boston Society of Civil Engineers, Journal* (M.)	Boston
Can. Engr.	*Canadian Engineer* (W.)	Toronto
Cem. Eng.	*Cement and Engineering News* (M.)	Chicago
Cornell C. E.	*Cornell Civil Engineer* (M.)	Ithaca
Dock & Harbour	*Dock and Harbour Authority* (M.)	London
Eisenbau	*Der Eisenbau* (M.)	Leipsig
Eng.	*Engineering* (W.)	London
Eng. Club, St. L.	*Engineers Club, St. Louis, Journal* (Bi-M.)	St. Louis
Eng. & Contr.	*Engineering and Contracting* (W.)	Chicago
Eng. Inst. Can.	*Engineering Institute of Canada, Journal* (M.)	Montreal
Eng. N. R.	*Engineering News-Record* (W.)	New York
Engrs. Soc. Pa.	*Engineers' Society of Pennsylvania, Journal* (M.)	Harrisburg
Engrs. Soc. W. Pa.	*Engineers' Society of Western Pennsylvania, Journal* (M.)	Pittsburgh
Engr.	*Engineer* (W.)	London
Engrs. & Eng.	*Engineers and Engineering, Engineers' Club of Philadelphia* (M.)	Philadelphia
Gen. Civ.	*Le Génie Civil* (W.)	Paris
Gesund. Ing.	*Gesundheits Ingenieur* (W.)	Munich
Inst. C. E.	*Institution of Civil Engineers Minutes of Proceedings* (Q.)	London
Inst. Mun. & Co. Engrs.	*Institution of Municipal and County Engineers, Journal* (W.)	London
Int. Ry. Assoc.	*International Railway Association, Bulletin* (M.)	Brussels
Land. Arch.	*Landscape Architecture* (M.)	Harrisburg
Mech. Eng.	*Mechanical Engineering* (M.) *Journal of the American Society of Mechanical Engineers*	New York
Mil. Engr.	*Military Engineer* (M.)	Washington
Min. & Metal.	*Mining and Metallurgy* (M.) *American Institute of Mining Engineers*	New York
Mun. & Co. Eng.	*Municipal and County Engineering* (M.)	Indianapolis
N. E. W. W. Assoc.	*New England Water Works Association, Journal* (M.)	Boston
N. Y. R. R. Club	*New York Railroad Club, Proceedings* (M.)	Brooklyn
Oest. Ing. Arch. Ver.	*Oesterreichischer Ingenieur und Architekten Verein, Zeitschrift* (W.)	Vienna
Power	*Power* (W.)	New York
Rev. Gen.	*Revue Générale des Chemins de Fer* (M.)	Paris
Ry. Age	*Railway Age* (W.)	New York
Ry. Main. Engr.	*Railway Maintenance Engineer* (M.)	Chicago
Ry. Rev.	*Railway Review* (W.)	Chicago
Schw. Bauz.	*Schweizerische Bauzeitung* (W.)	Zurich
Sci. Am.	*Scientific American* (M.)	New York
Soc. Ing. Civ. Fr.	*Société des Ingénieurs Civils de France, Mémoires et Comptes Rendus* (Q.)	Paris
Ver. deu. Ing.	*Verein deutscher Ingenieure, Zeitschrift* (W.)	Berlin
West. Ry. Club	*Western Railway Club, Proceedings* (M.)	Chicago
West. Soc. Engrs.	*Western Society of Engineers, Journal* (M.)	Chicago
Zeit. Bau.	*Zeitschrift fur Bauwesen* (Q.)	Berlin
Z. d. Bauver.	*Zentralblatt der Bauverwaltung* (Semi-Weekly)	Berlin

* Y = Yearly; Q = Quarterly; M = Monthly; F = Fortnightly; W = Weekly.

A. Applied Sciences

a. Processes of Calculation

2. Graphical and Nomographical Processes

Graphical Determination of Azimuth.* W. Norman Thomas. Inst. Mun. & Co. Engrs. Mar. 25, '22.

B. Applied Mechanics

a. Mechanics of Solids (Strength of Materials)

2. Elastic Solids

Das Verhalten mechanisch beanspruchter Metalle.* (The Behavior of Metals Under Mechanical Loads.) E. Honneger. Eisenbau. Serial beginning Mar. '22.

Berechnung dünnwandiger Drehkörper auf Biegung.* (Calculation of Thin-walled Bodies of Revolution as to Flexure.) F. K. Th. van Jterson. Ver. deu. Ing. Mar. 4, '22.

Verdrehungsschwingungen und ihre Dampfung.* (Fluctuations in Torque and Their Limitations.) L. Gümbel. Ver. deu. Ing. Mar. 18, '22.

4. Riveted Systems

Beitrag zur Berechnung der Nebenspannungen.* (Contribution to the Calculation of Secondary Stresses.) K. Tsalyscheff. Eisenbau Mar. '22.

b. Hydraulics

1. Processes of Measurement

Expériences sur des Déversoirs à Nappe Libre avec Contraction Latérale.* (Experiments on Sharp Crested Weirs with Lateral Contraction.) V.-M. Hegly. Ann. P. et C. Nov.-Dec. '21.

Bestimmung von stromenden Gas- und Flussigkeitsmengen aus dem Druckabfall in Rohren.* (Determination of the Quantity of Flowing Gas or Liquids from the Loss in Pressure in Pipes.) Max Jakob. Ver. deu. Ing. Feb. 25, '22.

3. Industrial Hydraulics

Water Power Resources of Canada. J. T. Johnson. Can. Engr. Mar. 28, '22.

Hydroelectric Installation on the Kern River.* Ely C. Richardson. Mech. Eng. Apr. '22.

Surge Tanks.* B. F Jakobsen. Am. Soc. C. E. Apr. '22.

Test Code for Hydraulic Power Plants and Their Equipment.* A. S. M. E. Committee on Power Test Codes. Mech. Eng. Apr. '22.

The American Mixed-Flow Turbine and Its Setting.* Arthur T. Safford and Edward Pierce Hamilton. Am. Soc. C. E. Apr. '22.

Hydro-Electric Power Situation at St. John. Can. Engr. Apr. 4, '22.

Placing 410 000 Cu. Yd. of Concrete on Ontario's Niagara Power Development.* A. C. D. Blanchard and R. B. Young. Eng. N. R. Serial beginning Apr. 6, '22.

Smoky Falls Development on the Sturgeon River.* C. C. Irvine. Can. Engr. Apr. 11, '22.

Design of Sand Box for Kern River Hydro-Electric Plant.* Eng. N. R. Apr. 13, '22.

Excursion de la Société des Ingénieurs Civils en Dauphiné en Provence et à Marseille: Partie Electricité.* (Excursion of the Société des Ingénieurs Civils to Dauphiné, Provence and Marseille: Electrical Section.) L. Bellot. Soc. Ing. Civ. Fr. Oct.–Dec., '21.

Idées Générales et Pratiques pour l'Etablissement d'un Avant-Project de Station Marémotice avec Usine Régulatrice.* (General and Practical Points for the Establishment of an Experimental Tide-Power Station with an Auxiliary Plant.)* M. Bare. Ann. P. et C. Nov.-Dec. '21.

Technisch-wirtschaftliche Betrachtungen zum Wasserkraftwerksbau in Nordamerika. (Technical and Economic Considerations on the Construction of Water Power Plants in North America.) Schw. Bauz. Serial beginning Mar. 4, '22.

Die Einführung der elektrischen Zugförderung auf den österreichischen Staatsbahnen und der Ausbau der österreichischen Wasserkräfte.* (The Introduction of Electric Traction on the Austrian State Railways and the Development of Austrian Water Power.) R. Seifert. Z. d. Bauver. Serial beginning Mar. 11, '22.

Energievernichter für Hochdruckwasserkräfte.* (Energy Neutralizer for High Pressure Water Power.) K. Imhof. Oest. Ing. Arch. Ver. Mar. 17, '22.

Die projektierten Silsersee-Bergeller Kraftwerke.* (The Projected Silsersee-Bergeller Power Plants.) Adolf Salis. Schw. Bauz. Apr. 1, '22.

c. Pneumatics

2. Physical Pneumatics (Flow of Gases, Waves, Air Resistance, Action of the Wind)

Der Windanfall.* (Wind Penetration—Influence of Wind on Heating and Ventilation of Buildings.) F. Zaruba. Gesund. Ing. Mar. 4, '22.

3. Industrial Pneumatics (Wind Mills, Transmissions by Compressed Air, Blowers, Compressors, Propulsive and Elevating Machinery)

Conveying and Elevating Machinery.* Gardiner Mitchell (From paper read before Inst. Mech. Engrs.) Dock & Harbour. Apr. '22.

Limited Installation Space Leads to Special Elevating Equipment.* M. W. Hibbard. Eng. N. R. Apr. 6, '22.

C. Materials of Construction and General Processes

a. Lime, Cement, Mortar, Concrete, Brick, Bitumen, Timber, Gravel, etc.

Cresoil.* R. G. Smith. Am. Wood Prs. Assoc. 1921.

A Theory on the Mechanism of the Protection of Wood by Preservatives.* Part 11. Ernest Bateman. Am. Wood Prs. Assoc. 1921.

Report of Committee No. 5-5-1.—Pressure Treatments. Am. Wood Prs. Assoc. 1921.
Wood Preservation as a Conservation Policy. Walter Buehler. Am. Wood Prs. Assoc. 1921.
Perforated Butt-Treated Poles. W. M. Leavitt. Am. Wood Prs. Assoc. 1921.
Service-Tests of Treated and Untreated Fence Posts.* J. D. MacLean. Am. Wood Prs. Assoc. 1921.
Experiments with Butt-Treated Poles in California.* P. R. Hicks. Am. Wood Prs. Assoc. 1921.
Creosoted Lumber in Connection with Farm and Ranch. E. A. Lindsley. Am. Wood Prs. Assoc. 1921.
Report of Committee No. 4—Preservatives.* Am. Wood Prs. Assoc. 1921.
Report of Committee No. 7-01—Economics. Am. Wood Prs. Assoc. 1921.
Results of Some Tests of the Effects of Zinc Chloride on the Strength of Wood.* T. R. C. Wilson and Ernest Bateman. Am. Wood Prs. Assoc. 1921.
The Effect of the Zinc Chloride Process of Preservation on the Strength of Structural Timber.* H. B. Luther. Am. Wood Prs. Assoc. 1921.
Treatment of Mine Timber. L. W. Conrad. Am. Wood Prs. Assoc. 1921.
20-"Year" Tests of Cement and Mortar Materials. Cem. Eng. Apr., '22.
Methods of Crushing Stone in Texas.* Cem. Eng. Apr. '22.
New Laboratory Abrasion Test for Concrete.* Cem. Eng. Apr. '22.
Action of Alkali Salt on Portland Cement Mortars.* Dalton G. Miller (From paper read before Minnesota Surveyors' and Engrs.' Soc.) Eng. & Contr. Apr. 12, '22.
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b. Metals

Sur les Progrès Techniques et d'Exécution Réalisés dans la Reconstruction des Ouvrages d'Art du Nord et de l'Est par les Ingénieurs Civils Francais.* (On the Technical Progress and Work done in Reconstruction in the North and East by French Civil Engineers). G. Leinekugel Le Cocq. Soc. Ing. Civ. Fr. Oct.-Dec., '21.

c. Preservation and Use of Materials. Painting, Waterproofing

How Membrane Waterproofing Is Laid.* A. S. Harrison. Ry. Main. Engr. Apr., '22.

f. Rock Excavation. Mining. Rock Removal

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g. Execution of Works. Specifications

2. Of Concrete
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3. Of Wood
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h. Foundations

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k. Tunnels and Tunneling-Shields

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D. Highways

c. Construction

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d. Maintenance

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h. Vehicles. Automobiles

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x. Miscellaneous

How 30-Year Old Brick Pavements Are Serving Lynchburg, Va.* Boyd A. Bennett. Eng. & Contr. Apr. 5, '22.

E. Bridges, Viaducts, and Arches

b. Iron or Steel Bridges and Viaducts

Second Railway Cantilever Bridge Over "Reversing Falls".* Eng. N. R. Mar. 30, '22.
The Reconstruction of the Baltimore and Ohio Railroad Bridge Crossing the Allegheny River at Pittsburgh, Pennsylvania.* Philip George Lang, Jr.* Am. Soc. C. E. Apr., '22.
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Maryland Street Concrete Arch Bridge, Winnipeg.* J. F. Greene. Can. Engr. Mar. 28, '22.
Steel Rib Reinforcement Used for Concrete Arch Centers.* Eng. N. R. Mar. 30, '22.
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Thrust of Skew Barrel Arch Measured on Laboratory Model.* Clyde T. Morris. Eng. N. R. Apr. 20, '22.

g. Swing, Bascule, Lift, Floating, Oscillating Bridges; Traveling Cranes

Chicago Double-Deck Drawbridge with Elevated Railway.* Eng. N. R. Apr. 6, '22.

F. Inland Waters

b. Canals (General Articles)

Notes on Canal Projects in Southwestern Germany.* Karl Haller. Eng. N. R. Mar. 30, '22.

c. Regulation of Waterways—Volume of Discharge, Freshets, Floods, Soundings

An Examination of the Plan for Canalizing the St. Lawrence River. Wilfred H. Schoff. Engrs. & Eng. Mar., '22.

e. Locks, Lifts, Elevators, Inclined Planes

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j. River and Lake Ports, Equipment

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G. Maritime Works

c. Vessels and Maritime Navigation. Lighthouses and Buoys. Various Signals

Mechanical Gearing and Electrical Transmission.* Engr. Mar. 24, '22.
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d. Roads and Outer Harbors. Dikes and Jetties. Breakwaters

Curved Pile and Rock Breakwater Built in Deep Water.* Eng. N. R. Mar. 30, '22.

g. Dredges and Dredging. Force Pumps. Refloating and Removing Wrecks. Ice-Breakers

Multiple Type Hopper Dredger "Seetief".* Dock & Harbor. Apr., '22.

h. Wharves. Mooring Buoys. Harbor Equipment

Deep Water Quays.* Ernest Latham. Eng. Mar. 31, '22.
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j. Dockyard Machinery and Shipyards. Dry Docks

Le Nouveau Bassin de Radoub du Havre.* (The New Dry-dock at Havre.) Georges Hersent. Soc. Ing. Civ. Fr. Oct.-Dec., '21.

H. Railroads, Street and Interurban Railways, Automobiles, Aeronautics

a. Railroads

1. General Articles

Completing the Government Railroad in Alaska.* Ry. Age. Apr. 1, '22.
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Le Réseau Ferré Marocain.* (The Railway System of Morocco.) Marcel Peschaud. Rev. Gen. Mar., '22.

3. Roadbed (Grading Construction Work)

Recent Practice in Replacing Trestles by Earth Fill.* Eng. N. R. Apr. 6, '22.

4. Track

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A Means of Determining the Average Life of Ties.* V. K. Hendricks. Ry. Age. Mar. 25, '22.
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5. Signals and Safety Apparatus

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6. Rolling Stock (Locomotives, Cars)

On the Question of Interchange of Rolling Stock. Charron Int. Ry. Assoc. March, '22.
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8. Stations. Engine Houses. Shops

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d. Street Railways. Elevated Railways, Subways

5. Rolling Stock

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e. Automobiles

2. Internal Combustion Engine Automobiles

Camion Automobile à Gaz Pauvre Portant son Gazogène.* (Auto-Truck Operating on Producer Gas Carrying its Own Gas Producer.) Gen. Civ. Mar. 4, '22.
Les Nouveux Ateliers de Révision et de Réparation des Autobus de Londres, à Chiswick.* (New Shops for Inspecting and Repairing London Autobuses at Chiswick. P. Calfas. Gen. Civ. Mar. 18, '22.

x. Miscellaneous

Neue Werkzeugmaschinen für die Automobilindustrie.* (New Machine Tools for the Automobile Industry.) Buxbaum. Ver. deu. Ing. Mar. 4, '22.

f. Aeronautics

2. Dirigible Balloons

Die Selbstentzündung ausströmenden wasserstoffes.* (The Spontaneous Ignition of Escaping Hydrogen.) (In dirigible balloons.) Wilhelm Nusselt. Ver. deu. Ing. Mar. 4, '22.

I. Municipal Water-Works. Agricultural Engineering

c. Dams and Reservoirs

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d. Analysis and Purification of Water

A Rating of the Qualities of the Water Supplies of Massachusetts.* George C. Whipple. N. E. W. W. Assoc. Mar., '22.
Pollution of Streams Affecting Industrial Uses.* J. Frederick Jackson. N. E. W. W. Assoc. Mar., '22.
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e. Distribution of Water

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The Economy of High Initial Cost and Extreme Care in Service-Pipe Installation. Reeves J. Newsom. N. W. W. W. Assoc. Mar. '22.
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f. Drainage of Land

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J. Sewerage. Sewage and Refuse Disposal

a. Sewers and Drains

Constructing the Turkey Creek Sewer in Kansas City, Missouri.* Paul A. Hartung. Mun. & Co. Eng. Apr., '22.
Von der Entwässerung der Kleinsiedelungen. (The Drainage of Small Settlements.) Ewald Genzmer. Gesund. Ing. Mar. 25, '22.

b. Sewage Disposal. Purification

How Grit Chambers Work at the Worcester Sewage Plant.* Ray S. Lamphear. Eng. N. R. Mar. 30, '22.
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c. Refuse Disposal

Refuse Disposal by Incineration in Institutional and Industrial Buildings. William F. Morse. Mun. & Co. Eng. Apr., '22.

K. Heat Engines.

a. Steam Engines. Boilers

Steam Boilers.* F. W. Dean. N. E. W. W. Assoc. Mar. '22.
Die Fahrtregler der Dampffördermaschinen.* (Controlling Device for Steam Hoists.) H. Hoffmann. Ver. deu. Ing. Feb. 25, '22.
Maschinenbetrieb mit Abdampfverwertung.* (Engine Operation with a Utilization of the Waste Steam.) Ludwig Schneider. Gesund. Ing. Mar. 11, '22.
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Eine modern Dampfturbinen-Anlage auf Spitzbergen.* (A Modern Steam Turbine Installation at Spitzbergen.) A. C. Gogstad. Schw. Bauz. Mar. 25, '22.

b. Gas and Oil Engines

The Use of Water Injection in Semi-Diesel Oil Engines. R. B. White. Power. Apr. 18, '22.

L. Electricity

b. Distribution and Transmission of Electricity

1. Power Plants

The Superpower System. Henry Flood, Jr. A. I. E. E. Serial beginning Apr., '22.

System and Operating Methods of Consumers Power Co.* W. W. Tefft. Power. Apr. 4, '22.

Largest Station Using Pulverized Coal.* Power. Apr. 18, '22.

L'Appareillage des Usines Electriques Californiennes à 220 000 Volts.* (220 000 Volt Apparatus in the Electric Plants of California.) Gen. Civ. Apr. 1, '22.

2. Long-Distance Transmission of Energy

Welded Radio Towers 150 Ft. High Built at Peking.* H. S. Bear. Eng. N. R. Apr. 20, '22.

3. Distribution and Wiring of Electricity

Use of Creosoted-Wood Conduit on Pacific Coast.* C. H. Judson and E. Wismer. Am. Wood Prs. Assoc., 1921.

Méthodes Différentielles de Sectionement des Circuits à Haute Tension en Cas de Surintensité. (Differential Methods of Dividing High Tension Circuits in Case of Excess Voltage.) Gen. Civ. Mar. 18, '22.

5. Transformers and Converters

Magnetic Flux Distribution in Transformers.* Karl B. McEachron. A. I. E. E. Apr., '22.

d. Mechancal Uses of Electricity

2. Servomotors, Hoists, Elevators, Handling Machinery

Auxiliary Electrical Equipment for Motor-Operated Cranes.* H. W. Eastwood. A. I. E. E. Apr. '22.

Electric Crane Controllers.* J. F. Schnabel. A. I. E. E. Apr., '22.

e. Electro-Chemistry and Electrometallurgy

Making Chlorine at the Point of Consumption. Clarence W. Marsh. N. E. W. W. Assoc. Mar., '22.

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f. Signals and Communication

Radio-Activity.* Eng. Mar. 31, '22.

A Relay Recorder for Remote Control by Radio.* F. W. Dunmore. A. I. E. E. Apr., '22.

x. Miscellaneous

Elektrische Linearheizung, System Zweifel-Oerlikon.* (Zweifel-Oerlikon System of Electric Linear Heating.) Schw. Bauz. Mar. 11, '22.

M. Architecture

a. Educational, Government and Scientific Buildings

Der Entwurf zum Gemeindemuseum im Haag.* (Design for a Community Museum in Haag.) Z. d. Bauver. Feb. 25, '22.

Das Werkbund-Haus auf der Frankfurter Messe.* (The Exhibition Building at the Frankfurt Fair.) Z. d. Bauver. Mar. 18, '22.

b. Business and Commercial Buildings

Les Travaux d'Agrandissement du Stock Exchange, de New York.* (The Work of Enlarging the Stock Exchange in New York.) Gen. Civ. Mar. 25, '22.

c. Residences. Hotels

Results of a Housing Scheme by Direct Labour.* William H. Eley. Inst. Mun. & Co. Engrs. Mar. 25, '22.

Des Murs et du Bloc Athermane avec Vides "Chromatiques".* (Walls of Athermanous Blocks with "Chromatic" Voids.) A. Knapen. Soc. Ing. Civ. Fr. Oct.–Dec., '21.

g. Other Buildings

Two Committees Charge Knickerbocker Collapse to Twisting Failure of Truss End.* Eng. N. R. Mar. 30, '22.

Building Failures.* Theodore L. Condron. West. Soc. Engrs. Apr. '22.

h. Roofs, Domes

Treated Lumber for Insulating Roofs of Moist Factory.* F. J. Hoxie. Am. Wood Prs. Assoc. 1921.

i. Fire Protection

Dispositifs Automatiques de Protection des Edifices contre l'Incendie.* (Automatic Apparatus for Protecting Buildings from Fire.) Jacques Michaut. Gen. Civ. Apr. 1, '22.

N. Landscape Engineering. City Planning

Proposed Zoning Ordinance for Philadelphia.* Joseph C. Wagner and George R. Mackenzie. Engrs. & Eng. Feb., '22.

Suburban Planning. Charles F. Mebus. Mun. & Co. Eng. Apr., '22.

The Relation of City Planning and Zoning to the Selection of Type of Pavement. Jefferson C. Grinnalds. (Paper read before City Paving Conference.) Can. Engr. Apr. 18, '22.
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Eine ostpreussische Kleinsiedelung.* An East Prussion Small Settlement. (Relates to city planning.).) Seeliger. Schw. Bauz. Apr. 1, '22.

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